REVIEW

OF

FOREST ADMINISTRATION

IN

BRITISH INDIA

FOR THE YEAR

1888-89.

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BY

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REVIEW

OF

FOREST ADMINISTRATION IN BRITISH INDIA

FOR THE YEAR 1888-89.

INTRODUCTION.

SUMMARY OF PROGRESS DURING THE FIVE YEARS 1884—1889.

It was noted in issuing the Annual Review of Forest Administration for the year 1883-84 that it would be useful to recapitulate once every five years the principal measures in the Forest Department which had occupied the attention of the Government of India during that period. The progress and changes made since 1884 are, therefore, briefly summarized in the follwing review.

Conduct of Forest business by the Government of India.

2. The Forest business has been transferred from the Home to the Revenue and Agricultural Department of the Government of India, but remains in charge of the same Member of Council. The change was made in consideration, amongst other matters, of the fact that agricultural interests are connected with, and sometimes depend on forest-conservancy.

The Honourable Members in charge have been Sir S. C. Bayley, K.C.S.I., C.I.E., from 1882 to October 1886, the Honourable J. B. Peile, C.S.I., from 1886 to April 1887, Sir C. U. Aitchison, K.C.S.I., C.I.E., from 1887 to November 1888, and since that date the Honourable P. P. Hutchins, C.S.I. Sir E. C. Buck, Kt., has been Secretary in the Revenue and Agricultural Department, and Mr. B. Ribbentrop, C.I.E., has filled the office of Inspector General of Forests, during almost the entire period. Dr. Schlich, who held the permanent appointment of Inspector General, was absent on leave from February 1885 to December 1888, on which latter date he retired and became Principal Professor of Forestry at Cooper's Hill College. On his retirement the Governor General in Council recorded an acknowledgment of Dr. Schlich's valuable and distinguished services in organising and developing Forest Administration in India, and especially noticed his labours to perfect the technical knowledge of the Forest Staff.

The extensive and valuable Forests of Upper Burma.

3. The annexation of Upper Burma in January 1885 materially added both in value and extent to the Forest properties of the State; and although active measures to utilize and control these acquisitions were only taken in the beginning of 1887 they yielded a gross revenue of nearly sixteen lakhs of rupees during 1888-89, and this has since been exceeded.

Forest legislation.

4. Special Forest Laws have been enacted for Upper Burma, Baluchistan, and Berar, but that relating to Berar has still to be brought into force. The

Indian Forest Act has been extended to Coorg, and the Madras Act to the scheduled Taluks in the Godavari District.

The amendment of the different Forest Acts was in process of being carried out by a special Act.

Area of Forests controlled by the Department.

5. In 1884 the Department had under its control 74,212 square miles of forests, of which 48,765 were Reserves, while 8,585 were treated as Protected Forests under less stringent rules. The balance of 16,862 square miles of District Forests was managed without being subjected to any special regulation or rules. During the five years under review the total area managed by the Department increased to 101,191 square miles, made up as follows:—

	Square Miles.
Reserved Forests	54,323
Protected "	28,350
Unclassed "	18,518
TOTAL	101,191

Forest Settlements.

6. The work of Forest Settlement has been vigorously advanced in all Provinces, and this has contributed to the extension of the Reserves, as well as to the final adjustment and record of all rights with which the permanent forest estates are burdened. Much remains to be done, especially in Madras and Bombay, where a number of officers are employed exclusively on such work, and also in Upper Burma, where considerable areas have been selected for reservation.

Forest Surveys.

7. The survey of the forests of the North-Western Provinces was practically completed with the survey of the Garhwal forests; and the special Forest Survey Branch has, during the past five years, been chiefly employed in surveying the forests of Berar, the leased forests of Bashahr, the reserves of the Central Provinces, and in mapping the boundaries of forests in Bengal. The Survey of India Department has undertaken the survey of the forests in Madras, and has continued the work previously commenced in Bombay and Lower Burma. The progress thus made in procuring accurate maps of the forests on sufficiently large scales to meet all requirements has been very considerable, as exhibited in the following statement:—

PRESIDENCY OR PROVINCE.	SURVEYED WITH TOPOGRAPHICAL DETAIL ON THE FOLLOWING SCALES:—				Total Topographical Surveys.	Survey of Boundaries only.
	1"=1 mile.	2"=1 mile.	4"=1 mile.	8"=1 mile.		
	Sq. Miles.	Sq. Miles.	Sq. Miles.	Sq. Miles.	Sq. Miles.	Linear Ms.
Madras	245	...	191	...	436	...
Bombay	...	...	4,806	620	5,426	156
Bengal	...	...	115	...	115	1,147
North-Western Provinces and Oudh	...	178	132	...	310	262
Punjab	...	22	604	...	626	...
Central Provinces	...	...	783	...	783	8,900*
Burma (Lower)	...	423	955	...	1,378	...
Berar	...	1,221	795	...	2,016	...
TOTAL	245	1,844	8,381	620	11,090	10,465

* Chiefly carried out by departmental agency.

Working-Plans.

8. The progress made in the preparation of Forest Working-Plans, although not so great as is desirable, has been considerable, and the more thorough investigation of the forest resources which such Working-Plans imply have shown that the previous working, founded as it principally was on general information, erred too much on the side of caution, and that the annual outturn available exceeded in most cases that which had been previously taken to be the normal yield. Apart, therefore, from the certainty and stability which Working-Plans give to forest management, their introduction has led to a considerable increase of Forest Revenue.

General protection of Forest estates.

9. As regards the improvement of Government forest estates by means of general measures of protection, the high percentage of convictions that continues to be maintained in forest cases brought before the Courts shews that the Forest Laws are worked with great consideration for the people, while the law-abiding character of the population is seen in the circumstance that the total number of cases, including trivial offences, amounts each year to less than one for every four square miles of Reserved Forests, which as yet form little more than half of the forest area under control.

Fire-protection.

10. The area which it is attempted to protect from fires by special measures has been increased from 18,000 to 22,000 square miles. Failures now average as low as 13 per cent. of the area attempted, and the average cost has been reduced to about R8 per square mile or little more than 2 pies per acre.

Protection from grazing and browsing.

11. The injuries caused by the grazing of sheep and goats on State lands, and the advisability of restricting such grazing to areas where the least harm would result, were brought prominently to the notice of Local Governments and Administrations by the Government of India, and measures suitable to the different localities and conditions are being taken to give effect to the recommendations made.

Artificial reproduction.

12. The area of regular plantations has been steadily extended, and special attention has been given to the system* of teak *taungya* plantations in Burma and to cultural operations as aiding natural reproduction. At the close of the five years under review regular plantations covered 55,371 acres, *taungya* plantations (chiefly teak) occupied 16,119 acres, and cultural operations of different kinds had been successfully practised over 237,664 acres. For the re-stocking of the vast area of Indian forests, natural reproduction from seed or coppice shoots must, as has been often pointed out, be the mainstay; and the records of the marked improvement of the young growth in areas that are continuously protected from fire and grazing are a gratifying feature in the more recent Administration Reports.

Outturn.

13. The outturn of the forests has considerably increased during the past five years, but as it has hitherto been expressed in different denominations in the several Provinces, it does not admit of comparison. In future it will be expressed in cubic feet of timber and fuel, and in a money value for other produce

* This consists in permitting Forest Tribes who practise taungya, *i.e.*, who continually clear fresh patches of forest for new cultivation, to make their clearings in the Government Forests, provided that they sow the seeds of valuable timber trees, usually teak, with their crops. The cultivators are paid the following year for all healthy seedlings thus propagated by them.

14. Financially the progress of the Forest Department has been proportionate to the increased outturn. The gross receipts have advanced from R1,08,54,882 in 1883-84 to R1,38,98,451 in 1888-89, while the surplus has increased during the same period from R41,47,992 to R57,68,689. It is anticipated that in 1889-90 the gross receipts will reach 1½ crores of rupees, and that the surplus will fall little short of seventy lakhs.

Financial Results.

15. The course of instruction organised by Dr. Schlich in 1885 for recruits for the service in India was successfully carried out at Cooper's Hill by that officer, and arrangements are being made to extend the period of training, at first fixed at something more than two years, to a little less than three years. The permanent establishment of a Forest Branch at Cooper's Hill College is justly regarded as the most important feature in the recent history of Indian Forest Administration. Moreover, its influence will be felt not only by India and its dependencies, but also by Great Britain and the Colonies.

Forest Instruction.

The programme for the Dehra Dun Forest School, as laid down in 1884, has been steadily carried out with satisfactory results. During the five years under review, 79 Rangers' and 36 Foresters' certificates were granted, and a pleasing feature of the progress made in popularizing the School is the number of private students and of students sent by the different Native States. The former numbered 12 in 1888-89, and the latter 7. A revised memorandum of conditions for the admission and training of students was issued in 1887, and after the lapse of two years this was superseded by a complete 'Prospectus.' The further expansion of the School course and arrangements to meet the requirements of a considerably increased number of students are being considered with a view to the partial recruitment of the Controlling Staff in India in order to open higher appointments to Natives of India.

16. No changes of importance have taken place during the period under review in the organization of the Controlling Staff in the older Provinces, but a new staff, comprising 21 officers, has been sanctioned for the forest administration of Upper Burma. The weakness of the Forest Staff, as compared with the work to be done, has for some years engaged attention, and a reorganization scheme based to some extent on the recommendations of the Public Service Commission, has been under consideration. The opinions of all Local Governments and Administrations have been obtained, and a comprehensive scheme formulated for the Controlling Staff, comprising both an Imperial and a Provincial Service, the former to be recruited in England and the latter in India. Pending this reorganization being sanctioned, it has not been practicable to take up the remodelling of the Executive Forest Staff, a question which merits early attention.

Reorganization of the Controlling Staff.

17. The forests of the Central Provinces, of Oudh, and of Assam underwent a detailed inspection by the Inspector General of Forests, who reported on them and recorded suggestions for their future administration.

Inspections by the Inspector General of Forests.

18. After a long controversy agreements were concluded with the Bombay-Burma Trading Corporation for the working of the forests in Upper Burma, which they held under licenses granted by the late Burmese Government, and settlements with other licensees were in course of completion.

Settlement with Licensees of Forests in Upper Burma.

19. The *ad valorem* duty on timber brought to Moulmein from Karenni and the Shan States was, from the 1st April 1889, raised to the rate of 7 per cent. which had been in force prior to 1881. This was rendered the more necessary as most of the forests had become the property of the British Government in consequence of the arrangements made with the Shan States subject to Upper Burma.

Ad valorem duty on timber brought down the Salween river.

20. A Forest Commission was appointed in Bombay in July 1885 to enquire into the following matters :—

Bombay Forest Commission.

I.—Management of lands in which communal privileges are enjoyed.

II.—Privileges to residents of villages within whose limits no State Forests are included.

III.—Privileges to special classes.

IV.—Abuse of privileges.

V.—Supply of local wants.

VI.—Measures to ensure the co-operation of the people in the protection of forests.

VII.—Local industries.

VIII.—Forest produce removed from occupied lands.

IX.—Trade.

After sitting for sixteen months, this Commission submitted a very detailed Report (of 205 printed pages) and made certain recommendations, which were generally accepted by the Bombay Government and disposed of, so far as grazing and the supply of '*rab*' were concerned, by a Resolution which issued in 1889.

FOREST ADMINISTRATION, 1888-89.

SUMMARY.

21. The principal work done by the Forest Department during the year under review was as follows:—An area of 3,805 square miles was added to that under the control of the Department, which at the close of the year amounted to 101,191 square miles. Of this area, 82,673 square miles were administered under the provisions of special Forest Laws, and 19,291 square miles were successfully protected from fire. The quantity of timber and fuel extracted from the forests amounted to 131,373,173* cubic feet, in addition to grass, bamboos, and other minor forest produce to the value of R37,17,998. The gross revenue from all sources amounted during the year to R1,38,98,451 and the expenditure to R81,29,761, leaving a net surplus for the year of R57,68,689, as compared with an average annual net surplus for the preceding five years of R39,17,051.

Summary of the year's progress, 1888-89.

*Exclusive of the Bombay Presidency, where the outturn is still shown in different denominations.

CHAPTER I.

EXTENSION AND ORGANIZATION OF THE FOREST AREA.

I.—ALTERATIONS OF AREA.

22. The area under the control of the Forest Staff in all India amounted, at the close of the year under review, to 101,191 square miles, which was distributed as shown in the following statement:—

Province.		Forest area, in square miles.				Proportion of Forests to whole area of Province.	Remarks.
Name.	Area, in square miles.	Reserved.	Protected.	Unclassed State.	Total.		
						Per cent.	
Bengal	150,689	4,988	2,264	4,033	11,285	7	
North-Western Provinces and Oudh.	107,441	*3,596	69	132	3,797	4	*Includes 77 square miles of *Leased* Forests.
Punjab	106,613	†1,536	504	‡3,915	5,955	6	†Includes 321 square miles of *Leased* Forests.
Central Provinces	86,501	19,712	...	325	20,037	23	‡Includes 255 square miles of *Leased* Forests.
Lower Burma	87,220	§ 5,111	...	...	5,111	6	§Includes 422 square miles of *Taungya* areas.
Upper Burma	...	...	8,104	35	8,139	...	
Assam	45,350	3,447	937	5,641	10,025	22	
Coorg	1,581	241	309	308	858	54	
Ajmere	2,711	139	...	...	139	5	
Baluchistan	...	...	...	39	39	...	
Total	588,106	38,770	12,187	14,428	65,385	11‖	‖Upper Burma and Baluchistan left out of account.
Berar	17,711	1,538	...	2,615	4,153	23	
Total Bengal Presidency.	605,817	40,308	12,187	17,043	69,538	11‖	¶Exclusive of the areas of Feudatory and Tributary States, Zemindaries, and whole Inam villages.
Madras	¶84,575	**3,777	11,703	1,475	16,955	20	**Includes 181 square miles of *Leased* Forests.
Bombay	124,352	††10,238	4,460	...	14,698	12	†† Includes 34 square miles not at present in charge of the Forest Department.
Grand Total	814, 44	54,323	28,350	18,518	101,191	12‖	

23. The net increase during the year in the area under the control of the Department was 3,805 square miles as follows :—

Province.	Alterations in area, in square miles, during 1888-89. Reserved Forests. Increase.	Reserved Forests. Decrease.	Protected Forests. Increase.	Protected Forests. Decrease.	Unclassed State Forests. Increase.	Unclassed State Forests. Decrease.	Total. Increase.	Total. Decrease.
Bengal	1	...	75	...	...	...	76	...
North-Western Provinces and Oudh . .	...	12	...	4	...	...	...	16
Punjab	1	...	...	1	712	...	712	...
Central Provinces . .	...	340	...	...	...	1	...	341
Lower Burma . . .	20	...	...	...	...	...	20	...
Upper Burma . . .	...	...	2,951	...	...	...	2,951	...
Assam	137	...	...	1	...	156	...	20
Coorg	...	...	...	...	...	...	...	...
Ajmere	...	...	...	...	...	...	...	...
Baluchistan . . .	...	...	...	...	21	...	21	...
Net Total Increase or Decrease	...	193	3,020	...	576	...	3,403	...
Berar	...	4	...	...	41	...	37	...
Net Total Increase or Decrease, Bengal Presidency	...	197	3,020	...	617	...	3,440	...
Madras	...	*462	†186	...	225	...	...	51
Bombay	‡435	...	...	19	...	...	416	...
Grand net Total Increase or Decrease	...	224	3,187	...	842	...	3,805	...

Remarks.

* There was really a *net* increase of 367 square miles, but the area at the commencement of the year was found to be 829 square miles less than what it was reported to be at the close of 1887-88. The rectifying of this error causes the decrease.

† There was really a *net* increase of 234 square miles, but the area at the commencement of the year was found to be 48 square miles less than what it was reported to be at the close of 1887-88. The rectifying of this error reduces the increase as shown.

‡ Includes 34 square miles in the Northern Circle not in charge of the Forest Department.

The alterations of area made in Bengal, the North-Western Provinces, the Central Provinces, and in Berar were, however, practically nominal, being for the most part due to a reclassification or recomputation of areas already under forest management.

Considerable real additions were, however, made to the gazetted area in Upper Burma, Bombay, and Madras, where Forest Settlements are actively proceeding, and to a smaller extent in Assam. In the Punjab a large addition was made to the area of unclassed forest shown as under the control of the Department, but this was due to the transfer, for administrative convenience, of certain areas from the control of the Government of the North-Western Provinces to that of the Punjab, and to some areas, long under settlement, which it is proposed to constitute Protected Forests, being now for the first time shown on the books of the Forest Department.

24. *Bengal.*—The alterations made during the year in the areas under the control of the Department were unimportant. The area of Reserved Forests was increased by nearly 2 square miles. A net increase of some 75 square miles was recorded under the head of Protected Forests, but of this area nearly 70 square miles was merely a nominal addition due to corrections in estimated areas. In the Sunderbuns Division 17 square miles were added to the Protected Forests, while 11 square miles were disforested in the interests of cultivation. The area of Unclassed Forests and Waste Lands under the control of the Department remained unchanged.

North-Western Provinces and Oudh.—The alterations were slight. In the Central Circle the area of the Reserved Forests was nominally reduced by 12 square miles owing to a recalculation of area. The area under the control of the Department in the Oudh and School Circles remained unchanged.

Punjab.—There was a net increase during the year of 1 square mile to the Reserved Forests, and of 712 to the Unclassed State Forests, while the area of the Protected Forests was reduced by 1 square mile. The area of the Reserves was really increased by the Notification of new areas and by the transfer, for administrative convenience, of certain areas from the North-Western Provinces Government by some 20 square miles, but was reduced on recomputation of existing areas by a similar amount. The reduction in the area of the Protected Forests was chiefly due to transfers to the Canal Department. The large increase in the area of Unclassed Forests was due to transfers from the North-Western Provinces Government, and to certain areas, which have long been under settlement and which it is proposed to constitute Protected Forests, being brought on to the books of the Forest Department for the first time.

The areas of the different classes of forests will, it is understood, undergo further considerable modifications on final orders being passed in regard to several Forest Settlements which are now awaiting sanction.

Central Provinces.—Alterations in areas were, with the exception of 5 square miles, disforested under the Act, merely nominal, being due to recomputation, which disclosed a slight excess in the areas hitherto accepted as correct. The chief reduction was in the Sambalpur District, in which the Reserves, hitherto recorded as 715 square miles, were found to be only 394 square miles. Of a total area of 20,037 square miles, only the "Class A Reserves," measuring 4,010 square miles, are under, or in process of being brought under a regular system of forest management.

Burma (Lower).—The paucity of Civil Officers available for Forest Settlement Work impeded the progress of reservation. The area of the Reserved Forests in the Pegu Circle was only increased by 20 square miles (net) by the Notification of new Reserves. In the Tenasserim Circle no new Reserves were added to the previous area. It is, however, understood that considerable areas will shortly be added to the Reserves, and, in view of providing a permanent supply of Cutch, steps are being taken to set aside areas as Cutch Reserves.

Burma (Upper).—Good progress was made in the examination of the forests with a view of ascertaining their extent and capabilities, which is at present the most important duty of the Officers in the Circle. An estimated area of 8,139 square miles has been brought under the control of the Department and 1,067 square miles have been preliminarily notified with a view to settlement and reservation.

Assam.—The area of the Reserved Forests was increased by the addition of 138 square miles taken from the Unclassed State Forests, the area of which was proportionately reduced and 1 square mile of Reserved and 1 square mile of Protected Forests were disafforested.

Coorg.—No change took place during the year in the areas of the different classes of forest under the control of the Forest Department.

Ajmere.—There was no change during the year under review. It is admitted that the area of Government land reserved under the Ajmere Forest Regulation of 1874, though there are reasons for thinking that it is insufficient to provide for the wants of the population in forest produce, cannot be increased. It is, therefore, a matter for regret that no progress was made in the direction of taking over village lands for management by the Forest Department.

Andamans.—The whole area of the Andamans, with the exception of the portions which have been cleared for settlement, is practically "Government Forest." This area is, therefore, entered in the Returns as "Unclassed State Forest." Ten acres which have, hitherto, appeared as the area of "Reserved Forests" under the control of the Department have been omitted.

Baluchistan.—The area placed under the control of the Department for forest management was increased from 18 to 39 square miles. This increase includes two blocks of Juniper Forest in the neighbourhood of Ziarat, a block of 9 square miles on the Zarghin, and of 5 square miles in the Pishin Plain. It is understood that further areas in the Ziarat, Juniper Forests, and in the Zhob Valley may eventually be reserved.

Berar.—A net area of 48 square miles was included from the Demarcated State Reserves, while 44 square miles was added to the District Reserved Forests and 41 square miles to the District Unreserved Forests. But these changes were merely nominal and were due either to transfers or corrections. Of the nominal increase to the area of the District Unreserved Forests, 30 square miles resulted from area corrections, 37 square miles were given up for cultivation, and 48 were resumed, the real gain being over 11 square miles.

Bombay.—There was a net increase of 401 square miles to the area of the Reserves. Of this 83 square miles were due to corrections of acreage in the Nasik Division. In the Northern Circle 245 square miles were added, while 10 square miles were excluded from Reserves by Notification. In the Southern Circle 2 additional square miles were taken up, and in the Sind Circle there was a net gain of 80 square miles, after writing off 13 square miles lost by erosion.

The area of Protected Forests was reduced by 19 square miles, the greater part of which was transferred to Reserves.

Madras.—The areas returned in previous Reports as under forest management appear to have been to a certain extent inaccurate. These have now been corrected, with the effect of showing that the area under forest management at the commencement of the year was less by 877 square miles than the area returned as being under control at the close of the previous year. This difference is almost entirely due to the omission from the returns of the Northern Circle, as having been erroneously entered, of 769 square miles of "forests reserved under previous orders."

The addition made to the area of Reserved Forests during the year was 44 square miles in the Northern, and 375 square miles in the Southern Circle. This is considerably lower than the corresponding increase for the two previous years. The corrected area of forests of all kinds under the control of the Department at the beginning of the year was raised during the year by more than 800 square miles, and on the 31st March 1889 it stood at 16,955 square miles.

II.—Forest Settlements.

25. During the year Forest Settlements, on a very considerable scale, were in progress in the Punjab, Burma, Bombay, and Madras, and on a smaller scale in Bengal, the North-Western Provinces, Assam, Coorg, and Baluchistan. No areas would appear to be under Settlement in the Central Provinces, Ajmere, Andamans, and Berar. In the Central Provinces, however, what practically amounts to a Settlement, namely, the selection from "Class B" Reserves of the lands that are eventually to be permanently reserved under Class A, was in active progress.

It would seem advisable that in order that the progress made in Forest Settlements may be followed more accurately than is possible at present a summary account of the Settlement work done during the year, and the total expenditure incurred on such work when completed should be given in the Annual Forest Reports on a uniform plan, and the Government of India addressed Local Governments on the subject in Circular No. 35 F., dated 17th October 1889. In a subsequent Circular No. 1 F., dated 24th February 1890, it was stated that the Government of India desired to be placed in possession of a complete account of the capital that is invested by the State in the Forests, and as the expenditure incurred on Forest Settlements is not shown in its entirety in the accounts of the Forest Department, but appears more usually in those of the Civil Department, it was necessary that the full amount so spent should be duly recorded in the Annual Forest Administration Reports.

26. *Bengal.*—The area under Settlement under section 4 of the Forest Act amounted at the close of the year to 351 square miles. This area has now been under settlement for many years, and it is desirable that it should be finally dealt with at an early date.

North-Western Provinces and Oudh.—The Forest Settlements in progress in the Central Circle are reported to be practically completed and that in the meantime these areas have been placed under the control of the Forest Department. No Settlements are reported as in progress in the other Circles, but the question of further reservations in both the Oudh and the Central Circles is being considered.

Punjab.—Several large areas are reported to be under Settlement, but it does not appear that any progress was made during the year towards the final disposal of these settlements, some of which have been under consideration for nearly ten years.

Central Provinces.—No areas would appear to be under Settlement under the Forest Act but some progress appears to have been made in transferring the best portions of the reserved areas known as "Class B Reserves," which are at present merely protected, or at least are not very strictly managed, to the "Class A Reserves" which are to be placed under a regular system of Forest management. Up to the present, out of a total reserved area of 20,037 square miles an area of 4,010 square miles has been set aside under "Class A" for strict conservancy.

It is intended to reclassify the lands known as "B Reserves", into—

(1) Areas available for cultivation;
(2) Other areas;

and it is the aim of the Forest Department to add from year to year to the A Reserves by transfers from Class B, until the area brought into Class A is sufficiently large to meet in the future the requirements of all tracts which are likely to draw upon it for the supply of forest produce. It is understood that, under the arrangements now being carried out, nearly the whole of the B Reserves will in course of time be absorbed either by being given over to cultivation or by being transferred to A. There will thus remain the patches of Reserved Forests under regular treatment lying between areas allotted to villages, the suitable management of which will be considered hereafter.

Burma.—In *Upper Burma*, out of an estimated area of 8,139 square miles under the control of the Department, 1,067 square miles have been preliminarily notified with a view to their settlement and reservation. The settlement of these areas will be commenced as soon as there are Civil Officers available for the work, and further proposals for reservation are in course of preparation.

In *Lower Burma* the paucity of Civil Officers impeded the progress of reservation, but considerable areas will, it is reported, shortly be added to the Reserves, and, in view of providing a permanent supply of Cutch, steps are being taken to set aside areas as Cutch Reserves.

Assam.—During the year a total area of 138 square miles was declared Reserved Forest under the Act. The area under settlement under section 4 of the Forest Act was 61 square miles.

Coorg.—A total area of 7 square miles was gazetted during the year under section 4 of the Forest Act, with a view to reservation. This area has yet to be settled.

Ajmere.—There is no hope of the Reserved area being further increased, and no areas were settled or were under settlement during the year. No progress was made in the system of taking over village lands for management by the Forest Department.

Andamans.—The whole area of the Islands, with the exception of the small portions cleared for cultivation, is practically Government Forest and no settlements have been made or are contemplated.

Baluchistan.—An area of 21 square miles was reserved during the year and further reservations in Ziarat and the Zhob Valley are contemplated.

Berar.—Although there were a good many changes of area, no forests appear to have been under Settlement during the year.

Bombay.—The progress made in the settlement of the areas notified under the Forest Act is reported to have been unsatisfactory. The following are the figures for the year :—

Circle.	Areas notified under Section 34 of Forest Act.	Areas notified under Sections 4 and 28 of Act.	Areas settled during year.
	Square miles.	Square miles.	Square miles.
Northern	2,077	568	105
Southern	3,473	...	308
Sind	.....	49	...

Madras.—Although the area added to the Reserved Forests during the year, under section 16 of the Forest Act, only amounted to 419 square miles, this, it is explained, does not represent the entire amount of Forest Settlement work done, as, in addition, the settlement of 5,526 square miles was completed during the year, and 877 square miles were gazetted for settlement under section 4. The area of which the settlement had been commenced, but was still incomplete, amounted at the close of the year to 3,413 square miles, and the area of which the settlement has still to be taken in hand to 3,605 square miles.

III.—Demarcation.

27. Although the condition of the boundaries of the State Forests is sometimes dealt with in a cursory manner in the Reports, it would appear that, on the whole, the inspection of boundaries and the maintenance in good order of such marks as exist at present have been duly attended to. The information is, however, given in each Report in a different form and is consequently difficult to summarise. It is proposed in future to require more detailed reports under this head on a uniform plan, and a tabular statement has been suggested

in paragraph 2 of the Circular of the Revenue and Agricultural Department, No. 35-F., dated 17th October 1889, addressed to Local Governments.

The marking of forest boundaries on the ground by means of substantial marks by which they can be indisputably recognized, and the permanent maintenance of these marks in good repair, is of vital importance in a sound system of forest management, and forest maps would be of little use if they were unsupported by such marks.

28. *Bengal.*—Fair progress is said to have been made in demarcation work. The total length of boundaries demarcated by means of posts or pillars was 2,176·8 miles, and that of natural boundaries 1,349·9 miles. The total expenditure debited to "Demarcation" was ₹7,091, the average cost per mile of new demarcation remaining at ₹16, and that of the maintenance of old boundaries being ₹6-2 per mile as against ₹7-2 in the preceding year.

North-Western Provinces and Oudh.—The total expenditure in the three Circles on account of demarcation was ₹6,804, as compared with ₹4,852 in the previous year. The boundaries of the Central Circle are, as a rule, in good order; but in some cases much new demarcation is required. In the Oudh Circle nearly 20 miles of new ditching were completed, and 65 miles of the Nepal boundary cleared. By the introduction of the railway into the Kheri district the value of land has increased, and it is said that landlords are combining to dispute the forest boundary. In the School Circle the majority of the boundary pillars are in good order, the others are under repair or being rebuilt. The Nepal authorities again failed to keep their boundary line clear, but as they were only specially communicated with on the subject in January 1889, little could be expected of them during the year under review.

Punjab.—During the year 338 miles of new boundaries (boundary lines and trenches) were completed, and 434 miles of previously existing boundary lines were repaired. The Conservator states that circumstances point to the conclusion that the demarcation of the existing forests is practically complete. As late as 1887-88, it was, however, reported that 1,848 square miles of the existing (unclassed) forests were still entirely undemarcated, and that of the demarcated forest the number of boundary marks was still, in many cases, insufficient.

Central Provinces.—Good progress has been made in the demarcation of forest boundaries, practically the work has been finished in ten out of eighteen districts, and attention is being paid to the register of boundaries prescribed by the Forest Department Code.

Burma.—In *Lower Burma* it is reported that boundary marks are generally in good order in the Tenasserim Circle, and in the Pegu Circle attention has been paid to repairs. The final demarcation of some reserves that have been sanctioned for a considerable time has not yet been completed, and the early completion of this important work has been now ordered by the Government of India. As no reserves have as yet been sanctioned in Upper Burma final boundary marks have not been constructed.

Assam.—The clearing of boundary lines and the repairing of boundary marks was attended to in the complete manner in which this work is usually done in the Province, as the following statement shows:—

Total length of artificial boundaries and demarcated natural boundaries.	Length of artificial boundaries and demarcated natural boundaries cleared in 1888-89.	Total number of boundary mounds.	Number of boundary-mounds repaired in 1888-89.	Length of artificial boundaries and demarcated natural boundaries inspected by the Divisional Officer.	Average cost per running mile of boundary work.
Miles.	Miles.	Number.	Number.	Miles.	₹ a. p.
1,124	1,063	4,962	4,753	747	3 13 7

Coorg.—The information given in regard to the clearing of boundaries and the erection of boundary marks is scanty, and the Government of India has directed that future Reports should show how far the work of demarcation has been completed and to what extent the existing boundary marks have been kept in good order.

Ajmere.—It is reported that the boundary pillars round each reserve have been kept in repair.

Andamans.—As there are no *Reserved* or *Protected* Forests no boundaries are at present required.

Baluchistan.—All that is reported is that the boundaries of the Sibi Rakhs were cleared. The Zarghun Reserve has not yet been demarcated.

Berar.—The boundaries of the Demarcated State Forests were kept in order, and the demarcation of the Mehdari Forest was completed, but it is not explained whether all other forests of this class are now properly demarcated, or whether their boundaries have still to be marked off. The Government of India has ordered that fuller information on these points should be given in future Reports.

Bombay.—The total expenditure on demarcation on all three Circles of the Bombay Presidency amounted during the year to R32,468.

In the *Northern Circle* it is reported that the work of demarcation by the erection of forest boundary marks was pushed on vigorously, but that, although the demarcation of forest boundaries upon the ground by providing outward visible signs of forest reservation in the shape of a special forest boundary-mark has made considerable progress, still the greater portion of this most important work remains to be undertaken, and several years must elapse before all the forest boundaries in every division are finally marked out in the manner prescribed.

In the *Southern Circle* the demarcation work done would appear to have been the demarcation of 108 miles of forest boundary at a cost of R35·83 per mile.

In Sind it is reported that the regular demarcation of the forests may be said to be completed and that no expenditure was incurred during the year of such work.

Madras.—The total length of boundary demarcated during the year was 3,400 linear miles [1,828 miles in the Northern Circle and 1,572 in the Southern], the total expenditure incurred being R39,249, or on an average, R11-8-10 per mile. The rate of progress was, on the whole, much the same as in the previous year, while the cost of the work in the two Circles was more uniform. The great difference in cost of this work of demarcation in the two Circles is now explained by the fact that the demarcation was insufficiently done in the Southern Circle, and by a reduction of rates in the Northern Circle. It is stated that the erection of more substantial marks are called for in the former Circle.

IV.—Surveys.

29. The remarks already made with regard to demarcation work and to Forest Settlements also apply to Surveys. It is difficult to ascertain from the Reports what local surveys have been made, and impossible to say what surveys yet require to be carried out. It is proposed that this should be remedied in future Reports, and the Government of India has addressed Local Governments on the subject in its Circular No. 35-F. of 1889 already quoted, proposing that statements should accompany each Report showing what areas have been surveyed and what remain to be surveyed.

As regards the work done by the Forest Survey Branch, the principal operations conducted during the year were in the Bashahr State, Punjab, and in the Jubbulpore and Raipur Districts, Central Provinces, in continuation of the work in the preceding season; the surveys in the Tehri-Garhwal Forests, North-Western Provinces and in Berar, were also continued. New surveys were instituted in the Karamba Forest, Jaunsur Division, the Morar Forest, Naini Tal Division, and in the Ahiri Forest, Chanda District, Central Provinces.

The total area topographically surveyed amounted to 652 square miles, of which 32 square miles were mapped on the 16-inch scale, 617 on the 4-inch scale, and 3 on the 2-inch scale.

Of forest boundaries 499 linear miles were surveyed, against 146 in the preceding year, and 140 miles were traversed. Triangulation was extended over an area of 1,904 square miles, against 990 square miles in the previous season.

The cost-rate of the survey in the Bashahr State is R58 per square mile. In the Central Provinces the cost-rates are, in Jubbulpore District, R54-9, and in Raipur District, R54-6; both rates include the cost of survey of the boundaries on the 16-inch scale. In the North-Western Provinces (Morar and

Dolmar Forests) the cost-rate is R21 for the detail survey, and R14 for the triangulation and computations.

The total sum expended by the Forest Survey Branch amounted during the year to R78,988.

30. *Bengal.*—The surveys undertaken by the Department were unimportant. A party of the Imperial Survey Department of India completed the survey of the inner and outer boundaries of the Singhbhoom Sub-division, with the exception of a portion of the southern boundary of the Saranda Forests, and in the Angul Sub-division 75 miles of boundaries are understood to have been surveyed by the Cadastral Survey Party.

North-Western Provinces and Oudh.—The survey of the Jhansi Forests, on a scale of 8 inches to 1 mile, was being carried out by a party of the Revenue Survey Branch. It is however, for consideration whether maps on the scale of 4 inches to 1 mile would not suffice.

Punjab.—The survey of the leased Forests in Bashahr was continued by the Forest Survey Branch, and that of the Shahpur-Kandi Forests by the Survey of India Department.

Central Provinces.—The Forest Survey Branch completed the detail survey of a large portion of the forests in the Dhamtari range, and triangulation of the whole of the Sihawa Forests in the Raipur District. Other parties were at work during the year in the Jubbulpore District and the Ahiri Forests in Chanda. The Topographical Survey Party did good work in the Hoshangabad District. The Chief Commissioner laid down the outline of a plan for more fully utilising the professional Survey parties for Departmental purposes, by getting the Surveyors to show forest growth and soils on skeleton traces filled in as their work proceeds and the scheme has proved a practical success.

The plan has been brought to the notice of Forest officers generally. When the Surveyors receive assistance from the Forest Officers, sufficient to enable them to record the required information with accuracy, the tracings will be specially useful.

Burma.—In Lower Burma the progress made in surveys during the year by the Imperial Survey Department was much the same as in the previous year. The area surveyed during the year amounted to 312 square miles completed, as against 339 square miles in the previous year The cost was more than in 1887-88, notwithstanding that a smaller proportion of the work was done on the more expensive 4-inch scale.

In Upper Burma Divisional and Sub-divisional officers were engaged during the past open season in the work of examining the forests in order to ascertain their extent and capabilities with special reference to the improvement and utilisation of the Teak Forests, and in the survey of the forests with a view to the reservation of the more valuable teak-producing tracts. In the course of these operations 1,338 miles were traversed with chain and plane table or prismatic compass. Surveys of various tracts in the Bhamo, Chindwin, Mandalay, Minbu, Mu, and Pyinmana Divisions were carried out, the most important and extensive being in the Mu, Chindwin, and Pyinmana Divisions. Linear surveys and countings were made over 11,342 acres principally in the Pyinmana District, where the work could easily be carried on in consequence of the peaceful state of the district.

Assam.—With the exception of a few small boundary surveys of reserves, carried out by Divisional Officers without extra expenditure, the only survey work beyond the clearing of lines carried out was that of the Makum Forest, an area of 4½ square miles which was topographically surveyed by the Working-Plans Branch at the excessive cost of R255 per square mile.

Coorg.—No surveys were done during the year.

Ajmere.—It is not clear what progress was made during the year in the work of survey. The Report only says that four skeleton maps of all Forest Reserves are in hand.

Baluchistan.—Part of a reserve was surveyed by the Forest Officer.

Andamans.—No forest surveys have as yet been made.

Berar.—The survey of the Melghât Taluk was completed by the Forest Survey Department, with the exception that the western boundary touching on Nimar in the Central Provinces is still unsettled. The final cost-rates for this survey were R79 per square mile for surveys on the 4-inch scale, and R57 for those on the 2-inch scale. These costs compare with the favourably final cost-rates in other parts of India.

The survey of forests in the south of Berar was postponed until a classification of the forests has been decided on.

Bombay.—The area of forests, of which the survey was completed during the year, was 450 square miles plotted on the 4-inch scale, and 139 square miles on the 8-inch scale. The cost,

exclusive of mapping, was, for the Northern Circle, R65 and R187 per square mile for the two scales respectively, and for the Southern Circle for the smaller scale R190 per square mile. As the receipts per unit of area of the Reserved and Protected Forests only amounts to a net revenue of about one anna an acre a year, a survey costing R190 per square mile represents no less than 20 per cent. of the value of the forests. It is, therefore, evident that the cheaper scale must, as a rule, be adopted.

Madras.—The information with regard to the work done is insufficient. It would appear, however, that the party of the Imperial Survey Department, which was employed during the year on Forest Survey work, topographically surveyed 169 square miles on the scale of 4-inch = 1 mile, besides triangulating and traversing a considerable area, the total expenditure being R39,337. As regards departmental surveys comparatively little work was attempted and the expenditure only amounted to R7,474.

The Madras Government has ordered the submission in future of a special Report on the outturn of work and the expenditure incurred by the Survey parties. From the figures given the cost of the surveys would appear to be higher than in other parts of India. The desirability of discontinuing departmental surveys was urged by the Government of India in reviewing the Madras Forest Report of the previous year.

V.—Working-Plans.

31. The paucity of Officers of the Controlling Staff again prevented as much progress as was desirable being made in the preparation of Working-Plans. It is, however, admitted that Plans are urgently required for all the forests which are being exploited, and special establishments for the preparation of Working-Plans have been sanctioned under the orders of the Government of India, for Bengal, the North-Western Provinces and Oudh, the Punjab, the Central Provinces, Lower Burma, and Assam. No special Working-Plans Divisions have as yet been formed in Upper Burma, or for the minor charges in Coorg, Ajmere, Baluchistan, and the Andamans.

In the Provinces under the Government of India the work done during the year was as follows:—

Province.	Plans submitted for opinion and remarks of Inspector General of Forests.		Plans finally sanctioned by Local Governments on recommendation of Inspector General of Forests.	
	Number.	Area for which prepared.	Number.	Area for which prepared.
North-Western Provinces and Oudh	5	177 square miles	9	658 square miles
Burma	1	138 "	...	.....
Assam	1	7 "	...	.....
Coorg	1	83 "	1	83
Grand Total	8	405 square miles	10	741

The general tendency to over-elaborate the Plans prepared was alluded to in the Review for the previous year. It has not yet been sufficiently realised that, as the more systematic management of the forests necessitates the *immediate* preparation of a very large number of Working-Plans, these must, for the present, be of a very simple description and based on such data as are readily obtainable. To ensure uniformity and to assist Local Officers in the preparation of Plans of the sort required, the Government of India has now prescribed, in Circular No. 9-F. of 14th May 1889, that in future, in order to

enable the Inspector General of Forests to discuss the main principles of Plans before their preparation has proceeded too far to admit of changes being introduced without the sacrifice of labour and money, Conservators of Forests are to submit for his opinion, before or as soon as possible after the commencement of operations, a short description of the forests for which it is proposed to frame the Working-Plan with an outline of the contemplated Working-Scheme. This procedure had not, however, come into force by the end of the year under review.

The orders of the Government of India at present in force, urging the preparation of Working-Plans for all important forests, and requiring that such Plans before being sanctioned by Local Governments should first be submitted for the professional opinion of the Inspector General of Forests, were issued on the 21st December 1884. Up to the end of 1888-89, the following areas had been brought under the control of Working-Plans prepared under these rules:—

Areas brought under the control of sanctioned Working-Plans up to end of 1888-89 in Provinces under the Government of India.

Province.	Forest area, in square miles.				Area for which Working-Plans prepared up to 31st March 1889.	Proportion of Forest area under Working-Plans.
	Reserved.	Protected.	Unclassed.	Total.		
					Square miles.	Per cent.
Bengal	4,988	2,264	4,033	11,285	2	·01
North-Western Provinces and Oudh	3,596	69	132	3,797	751	19·78
Punjab	1,536	504	3,915	5,955	152	2·55
Central Provinces	19,712	...	325	20,037	*Nil.*	*Nil.*
Lower Burma	5,111	...	...	5,111	934	18·27
Upper Burma	...	8,104	35	8,139	*Nil.*	*Nil.*
Assam	3,447	937	5,641	10,025	"	"
Coorg	241	314	308	863	83	9·60
Ajmere	139	...	...	139	*Nil.*	*Nil.*
Baluchistan	...	...	39	39	"	"
Andamans	...	...	...	...	"	"
Berar	1,538	...	2,615	4,153	"	"
	40,308	12,192	17,043	69,543	2,095	2·76

This is undoubtedly slow progress and many of these Plans leave much to be desired. But it is hoped that with increased subordinate establishments more progress will be made, and that, in proportion as more experience is gained in the framing of Working-Plans, the sylvicultural requirements of the forests become better known, and the demands on the forests grow more steady and sure, the operations prescribed will become less speculative. At present with supplies in excess of the demand or a market for only a small portion of the products of a forest, there must be deviations from sanctioned Plans; but one of the advantages of well considered Plans is that works or cultural operations not executed in one year are not lost sight of, but are taken note of and carried out in subsequent years. The first Working-Plans were experimental, and as such they have been elaborate and costly in regard to the data collected

and embodied in them; but the provisions of the Plans themselves, which have now to be carried out, should, in the opinion of the Government of India, prove as workable as any directions which, with the available knowledge, can now be laid down.

Working-Plans are essential to systematic control, and must be provided for the more important forests with as little delay as possible; but it is clear that the limited number of special officers available for this work cannot, unaided, prepare Working-Plans for the vast area concerned within any measurable period. Under these circumstances, it seems desirable that Working-Plan officers should be assisted by the local officers in compiling suitable Working-Plans for the less important tracts. Divisional officers should have their special attention directed to the necessity of collecting data in anticipation of the preparation of Working-Plans, and be required to devote as much of their time to this duty as is compatible with other work.

32. *Bengal.*—Owing to the continued ill-health, necessitating eventually the departure, on furlough, of the Deputy Conservator entrusted with the duty, but little was done as regards the preparation of Working-Plans. The services of another officer have, however, now been made available for the charge of the Working-Plans Division, and it is hoped that more substantial progress will be reported in this direction in future years.

North-Western Provinces and Oudh.—Although considerable progress has been made in the preparation of Working-Plans much remains to be done. In the Oudh Circle no Working-Plans are as yet in force, although the area controlled by the Department amounts to 1,203 square miles. In the Central Circle 352 square miles were, at the end of the year, managed under Working-Plans, out of a total area of 1,778 square miles. In the School Circle Working-Plans have been prepared for 399 square miles, out of 815 square miles, and no new work appears to have been undertaken during the year under notice. The Working-Plans in force are, as a rule, drawn up for short periods only, and unless the work of preparing Plans for the remaining forests is pushed on, it will not be completed before the existing Plans call for revision or replacement.

Punjab.—The Conservator explains that, owing to the paucity of officers, the Working-Plans Branch was in abeyance. This temporary suspension of the work is to be regretted, and it is hoped that arrangements will be made to secure progress in the future in this important branch of Forest Administration by utilizing, if necessary, the services of officers in charge of divisions in collecting data and in preparing simple Working-Plans for the forests within their charges.

At the present Working-Plans are only in force over 364 square miles, out of a total area of 6,000 square miles controlled by the Forest Department.

Central Provinces.—The stock has been enumerated in certain forests and a commencement made in the collection of data for Working-Plans. With a special officer in charge, the preparation of Plans may be expected; but if any progress is to be made commensurate with the whole area to be covered, it will be found necessary to employ Divisional officers on the preparation of simple plans for the less important forests, and in supplying material for the compilation of more elaborate Plans by the Conservators or the Working-Plans officer.

Burma.—In the Pegu Circle the preparation of Working-Plans continued to receive attention. The advisability of regular Working-Plans being prepared for the more important forests of the East and West Salween Divisions of the Tenasserim Circle has been suggested by the Government of India. The existing Working-Plans are believed to be of a very rough character. In Upper Burma during the year valuation surveys were made over an area of 18 square miles, and a special report or rough Working-Plan was prepared for the Yeni Forest, containing 80 square miles; and it is also stated that similar Plans were in course of preparation for areas amounting in all to 752 square miles.

In view of the considerable area to be brought under management in Upper Burma, the Forest Staff is, for the present, more usefully employed in exploring, surveying, and roughly valuing the forests than in attempting to prepare detailed Working-Plans for special areas.

Assam.—Some small amount of progress was made with regard to the preparation of Working-Plans and such Plans for the Dambu and Darugiri Forests in the Garo Hills have been completed, and the surveys and enumerations necessary for a Working-Plan in the Makum Forest have been completed.

Since a special Working-Plans Division was created three years ago such Plans have only been framed for 11 out of a total area of 3,447 square miles of Reserved Forests in the Province. It is evident that, to be of any practical use, Working-Plans must be prepared at a more rapid rate.

Coorg.—The descriptive account of the compartments of Mawkal Forest was prepared by a Forest Ranger, but the Working-Plan was not completed during the year owing to want of time.

The Government of India has suggested that the preparation of Working-Plans in Coorg should be expedited as much as possible. At present only 83 square miles out of 863, of which 241 square miles are Reserves, have been subjected to that systematic control which Working-Plans alone afford.

Ajmere.—No Working-Plans have as yet been prepared for the Ajmere Forest, the working of which was carried out according to pre-considered Plans-of-Operations, but as these operations include protection from fire, the regulation of grazing, improvements by sowing and planting, as well as exploitation by coppice and other fellings, the Government of India has suggested that regular Working-Plans should be substituted for the yearly Plans-of-Operations at present employed.

Baluchistan.—No Working-Plans have as yet been prepared.

Andamans.—Working-Plans have not as yet been prepared for any portions of the Andamans forests. Such Plans will, however, be required as soon as a steady demand for a sufficiently large quantity of produce has been established, a contingency which would now appear to be within measurable distance of realisation.

Berar.—With the exception of a small portion of the forest area in the Melghat, for which a Working-Plan (which has since been cancelled) was sanctioned in 1887, no Working-Plans have as yet been prepared for the Berar Forests. The Conservator states that such Plans are urgently required, especially in connection with works of cultural improvement, which, in the South Berar Reserves, have been hitherto carried on without any pre-arranged system, but he expresses his inability to prepare them without the aid of special officers.

Bombay.—Details are wanting as to the area worked under the provisions of sanctioned Working-Plans. In the Northern Circle it would seem that all the Reserved Forests, and in certain talukas the Protected Forests (North and South Thana) have been formed into 287 Working Circles to be treated by the method of coppice with standards, subject to a rotation of 40 years. Only half the Circles appear to be worked at present, and even for them the establishments are inadequate. Although it may be found convenient to sub-divide coppiced forests in Europe into units of a few hundred acres, it by no means follows that a system of equal detail is possible or desirable in India, where the revenue is only a small fraction of that derivable from similar forests in Europe. A broader system of management, by which operations will be concentrated and supervision economised, should clearly be aimed at in India.

In the Southern Circle the only progress made towards the preparation of Working-Plans consisted in the collection of data with a view to the calculation of yield, which, however, were not applied. No Working-Plan was completed, nor is any progress reported in the preparation of Working-Plans for the forests of the Sind Circle.

It would appear to be desirable that a system of control should be adopted in Bombay similar to that in force in the Provinces under the Government of India, by which all Working-Plans as they were completed would be scrutinised before being formally sanctioned, and deviations from the prescribed operation would only be allowed under proper authority.

Madras.—It is stated that the preparation of Working-Plans has not advanced, and that this is due to the inability of the Department in its present condition to devote much attention to this work It is also stated that in most cases the Working-Plans in operation could not be strictly followed.

The Government of India has suggested that as the work of Settlement and Demarcation becomes more advanced, more prominence should be given to the preparation of Working-Plans and that Plans-of-Operations should not be allowed to take their place. Probably the only way to insure progress in this important branch of Forest Administration will be to establish some system of central control by which all Plans, as well as deviations from the prescribed operations, would be formally sanctioned by Government.

VI.—Communications and Buildings.

33. The opening up of the forests by means of new roads has met with considerable attention, as may be seen by a reference to the extracts given below. The provision of both office and house accommodation continued to necessi-

tate considerable expenditure in most Provinces, in Upper Burma more especially:—

34. *Bengal.*—During the year 42 miles of new roads and 35 miles of inspection paths were opened out at a cost of R4,660; 379 miles of roads and 299 miles of paths were repaired at a cost of R6,719. Two new Inspection Bungalows were built during the year, and four Rangers' and one Clerk's quarters, together with several out-houses and guards' huts, were completed during the year. The total expenditure on new work (buildings) amounted to R5,945, and repairs of existing buildings cost R6,503.

North-Western Provinces and Oudh.—The expenditure incurred during the year on communications amounted to R46,581; on buildings to R43,147, and on other similar works to R2,372: in all to R92,100. In the Central Circle 108 miles of roads and paths were made, the most important work being the construction of 17 miles of cart-road in Kumaon. In Oudh 147 miles of roads were made, and in the School Circle considerable progress in road-making was also made. The Local Government remark—

"Except in the School Circle, the expenditure was higher than in the previous year. The construction of roads in forests which are newly opened to the market is, of course, essential; and provision is needed for the shelter and accommodation of the servants of the Department; but it is necessary to repeat the remark that outlay on buildings should be very jealously watched and limited by the several Conservators."

Punjab.—For the year under review the expenditure on roads and bridges was R5,491, of which R3,655 was for new work and R1,836 for maintenance. New work consisted of 22½ miles of paths and bridle roads, costing R1,555 in Bashahr and in Chamba, of R150 for bridges, and R1,115 for 22 miles of road.

The expenditure on buildings amounted to R7,082, of which R4,151 was for new constructions, chiefly for quarters for the subordinate establishment, and R2,921 for maintenance.

Central Provinces.—The traces for two new Ghât roads were laid down and existing roads maintained. The total expenditure on "roads" during the year only amounted to R
On the construction of subordinates' quarters there was an outlay of R1,015; and in the repairs of buildings, rest-houses, and subordinates' quarters R1,417 were spent.

A further outlay was incurred in the up-keep of tanks and wells to supply water in the forests for the use of the forest establishment, amounting to R316.

The opening out of roads and the improvement of communications call for more attention.

Burma.—In Lower Burma a sum of R15,212 was expended during the year, chiefly on the repairs of existing buildings.

In Upper Burma considerable progress was made in providing necessary office and house accommodation for the members of the Forest Staff. A sum of R23,914 was expended during the year on this work.

Assam.—No new roads were constructed, but a sum of R3,212 was expended on maintaining existing roads and paths. The expenditure on buildings having been greatly restricted in recent years, a considerable outlay was necessary on repairs and maintenance, which, with the cost of some new temporary huts, amounted to R11,033.

Coorg.—During the year the sum of R965 was expended on roads and of R1,168 on buildings and similar works.

Ajmere.—A small sum was spent in repairing a road, and some new chowkis were constructed at a cost of R107. The total expenditure during the year amounted to R354, against R462 in 1887-88.

Baluchistan.—Two houses were built for the accommodation of Forest Guards at a cost of R133.

Andamans.—There is nothing to remark under this head, works on roads and buildings being generally executed by the District Settlement Officers.

Berar.—The work under this heading in Berar consists in the construction of roads, of wells and tanks, and, to a small extent only, of buildings. The roadwork is all confined to the Melghât hills of Ellichpur. Outside this region the forests are, in general, sufficiently accessible. For reasons of a corresponding nature the other works under this heading have hitherto mostly belonged to the Ellichpur Division.

The opening out of the 1,534 square miles of difficult hilly country, which constitutes the Melghât Forest region of Ellichpur, was commenced in 1874, and has continued ever since. Owing to the character of the ground, scarcity of labour, and an unhealthy climate, the progress has necessarily been slow and the cost great. In the year under review 24 miles of road were completed at a cost of R10,448, while R1,261 were expended on the repair of 191 miles of existing communications.

Four new wells were sunk and 17 wells cleaned.

Of forest works executed in the Public Works Department 36¾ miles of forest road were "under construction," and one anicut was "in progress;" but nothing was completed during the year.

Of buildings three new rest-houses, four new Thanas and one new Naka were completed. Petty repairs were also effected in the case of numerous Thanas and Nakas.

Bombay.—The Conservator of the Northern Circle states that no new projects for roads were submitted or new constructions undertaken by Forest Officers, but existing forest roads were improved and extended in all divisions by the Public Works Department, and several new roads have been laid out at the cost of the Provincial Services Budget, towards which the Forest Department contributes a considerable sum annually.

Buildings to serve as offices for Range Forest Officers were constructed by the Public Works Department where such accommodation was wanting, but no new works of importance, except the construction of Forest Guards' huts, and repairs to forest stations and posts, were undertaken by Forest Officers.

The Conservator of the Southern Circle states that it might appear from the small amount expended, R1,973 on roads and R4,280 on buildings, that communications were neglected in the Southern Circle. This is, however, not the case. With the exception of Kolaba and Ratnagiri, where creeks and rivers take the place of roads to a very great extent, the whole of the forest area is extremely well provided with roads, for the repairs of which large quantities of wood are given free every year from the forests.

In Sind the works undertaken under this heading were unimportant.

Madras.—The expenditure on roads, buildings, and other works was R59,841, which is an increase on the average. This, it is stated, is matter for satisfaction, as there remains much to be done in the way of making roads and building rest-houses. The tramway in Nellore continued, it is said, to work successfully, and that newly laid in North Arcot gave most satisfactory results.

CHAPTER II.

PROTECTION AND IMPROVEMENT.

I.—General Protection.

35. The number of breaches of the Forest Laws taken to Court is still extremely small in proportion to the area under control, and the high percentage of convictions obtained shows clearly that cases are only prosecuted, as a rule, on sufficient evidence.

The number of petty cases compounded shows a considerable increase, due, it is considered, to improved efficiency in the Protective Staff.

36. The subjoined statement compares the results of protection for the present and the past year, as regards offences against the Rules made under the Forest Acts:—

Province.	Number of cases taken into Court.		Number of cases Compounded.		Total.		Proportion of Convictions to the total number of cases decided by the Courts.	
	1888-89.	1887-88.	1888-89.	1887-88.	1888-89.	1887-88.	1888-89.	1887-88.
							Per cent.	Per cent.
Bengal . . .	254	516	1,450	1,867	1,704	2,383	80	91
North-Western Provinces and Oudh.	129	158	744	715	873	873	86	79
Punjab. . . .	1,348	1,487	998	335	2,346	1,822	68	67
Central Provinces .	213	277	7,303	6,804	7,516	7,081	76	84
Lower Burma . .	365	295	403	* 108	768	403	88	93
Upper Burma . .	9	21	16	† ...	25	21	93	93
Assam . . .	92	140	390	193	482	333	72	71
Coorg . . .	6	8	‡ ...	§ ...	6	8	67	100
Ajmere . . .	56	50	230	188	286	238	100	92
Baluchistan . .	5	12	22	37	27	49	100	54
Andamans . .	...	...	...	...	...	...	...	...
Total .	2,477	2,964	11,556	10,247	14,033	13,211	73	77
Berar . . .	496	387	...	...	496	387	84	82
Total Bengal Presidency.	2,973	3,351	11,556	10,247	14,529	13,598	75	77
Madras . . .	2,432	2,312	1,324	787	3,756	3,099	72	75
Bombay . . .	1,308	976	8,246	7,241	9,554	8,217	74	73
Grand Total .	6,713	6,639	21,126	18,275	27,839	24,914	74	76

* In the Tenasserim Circle only. The figures (527) for the Pegu Circle relate to *persons*, not cases.

† Information wanting.

‡ Compensation to the amount of R67-4 was recovered for damage done to Sandal trees.

§ Compensation to the amount of R295 was recovered for damage done to Sandal trees.

37. *Bengal.*—The number of prosecutions for breaches of the Forest Law was less than in the previous year by 50 per cent., and fewer offences were compounded. The relaxation of the Forest Rules in Orissa, on account of the scarcity which prevailed at the time, was the chief cause of the decrease in offences both prosecuted and compounded. The percentage of convictions obtained in Court fell from 91 in the previous year to 80 in the year under review. It would seem to the Government of India that breaches of rules are not adequately dealt with in the Sunderbuns Forest.

North-Western Provinces and Oudh.—There was again a decrease in the number of cases brought before the Courts compared with the previous year. In the Central Circle the changes in the rules for bamboo-cutting have worked well, and led to a decrease in the number of cases In the Oudh Circle the greater number of cases were for unauthorised felling and illicit grazing in Bahraich and Gonda. In cases compounded there has been a small increase compared with last year. In the School Circle the number of cases has doubled. These were con-

cerned with thefts of sleepers, unauthorised fellings, injury to forests by fires, and illicit grazing. The relations between the Department and the inhabitants of neighbouring villages are reported to be generally good.

Punjab.—The percentage of convictions, although slightly higher than in the preceding year, is still low. The number of offences committed decreased from 1,487 to 1,348.

The increase over the previous year, of 663 in the number of offences compounded, goes to counterbalance the decrease of 139 in the number of cases taken into Court. Approximately one-half of the offences committed were connected with grazing, and it has been suggested by the Government of India that the large number of animals impounded may, perhaps, indicate that the fines imposed are too small to have a deterrent effect.

Central Provinces.—The falling off in the percentage of convictions obtained from 84 in 1887-88 to 76 in the year under review. It is explained that this is due to the larger number of cases of injury to forests by fire, which it is difficult to bring home to the offender.

No fewer than 7,303 cases were compounded which the Chief Commissioner attributes to better watch-and-ward being kept by the Forest establishments. The amount paid to the Department as compensation for damages is not recorded.

Burma.—In Lower Burma the number of prosecutions was greater by 70 than in the previous year. Convictions were obtained in 88 per cent. of the cases, and this percentage, though lower than in the previous year, is sufficiently high to show that offenders are not taken to Court on insufficient evidence. In all 403 offences were compounded, R8,198 representing the compensation levied.

In Upper Burma breaches of the Regulation and Rules were few and for the most part trivial, but there were instances of more serious offences.

Inclusive of six cases pending from the previous year 15 prosecutions were undertaken, and these resulted in 13 convictions and the punishment of 25 persons. The offences compounded aggregated 16 cases and the total compensation received amounted to R336.

During the year the Forest Regulation and Rules were extended to the whole of the Shan States. It was not advisable, at the outset, to enforce the new Forest Regulation and Rules with too great strictness in any part of the newly acquired territory. But, as has been pointed out by the Government of India, the people must be made to understand as soon as possible that Forest Rules must be obeyed. The future of the Upper Burma Teak Forests depends on the enforcement of these rules, and it is inevitable that the present very small number of prosecutions should increase.

Assam.—Owing to the great abundance of forest produce throughout the Province and the liberality with which free grants of such produce are made to the ryots for home-consumption, offences against the Forest Rules in Assam are comparatively rare. During the year fewer cases were taken into Court than in the previous year, but the number of cases compounded out of Court was considerably greater.

Coorg.—Only six cases were prosecuted, four of which were convicted, and one is pending.

It is stated that many cases of trespass and shooting without license are not discovered, or are not brought to light by the Foresters and Guards, both on account of their carelessness and sympathy with the offenders.

Ajmere.—The number of offences prosecuted, as well as of those compounded, increased and, as there were no acquittals, it may be accepted that ill-considered prosecutions were not undertaken. There was also a considerable increase in the number of cattle impounded for trespass.

Baluchistan.—There were five prosecutions for unauthorized felling or appropriation of wood, in all of which convictions were obtained. Illicit grazing in Reserved areas occurred to a much smaller extent than in previous years.

Andamans—No Protective Staff is entertained and no prosecutions took place.

Berar.—The number of prosecutions for breaches of Forest Rules rose from 387 in 1887-88 to 496 in the year under report. Out of 501 cases dealt with (five pending from previous year) conviction was obtained in 417 cases. The more remarkable increase was in the number of prosecutions for unauthorized felling or appropriation of wood and other minor forest produce in the Buldana District regarding which enquiries are being made locally.

Bombay.—The number of offences prosecuted or compounded in the Northern Circle rose from 5,800 to 7,181, and was ten times as many as in the Southern Circle, although the forest area in the latter is nearly three-fourths of the former. The forest establishment in the same Circle impounded no fewer than 200,615 animals during the year. The percentage of convictions was extremely low, especially in the Sind Circle.

Some serious cases of unauthorized *dalhi* cultivation called for special attention, and it is hoped that the heavy assessments by which they were punished may prevent similar encroachments in future.

Madras.—The number of cases taken into Court, 2,432 cases, was almost the same as in the previous year, while the number of cases compounded was nearly double, being 1,324 in 1888-89 as compared with 787 the year before. The percentage of convictions to the total number of cases taken into Court is low and was slightly less than in the previous year. More uniformity in the procedure in dealing with forest cases is desirable.

II.—Protection from Fire.

38. The following table exhibits the areas under fire-protection in 1888-89, and the results of the year's operations compared with those of 1887-88 :—

Province.	Area, in square miles.				Proportion of Failures to area Attempted.		Cost.				Proportion of area under fire-protection to total area of Reserves. (*Leased* Forests included.)	
	Attempted.		Protected.				Per square mile protected.		Per acre protected.			
	1888-89.	1887-88.	1888-89.	1887-88.	1888-89.	1887-88.	1888-89.	1887-88.	1888-89.	1887-88.	1888-89.	1887-88.
					Per cent.	Per cent.	R	R	Pies.	Pies.	Per cent.	Per cent.
Bengal . . .	1,772*	1,565	1,291†	1,391	27	11	13	13	4	4	35	31
North-Western Provinces and Oudh‡	2,054	2,019	1,922	1,922	6	5	19	20	6	6	56§	55
Punjab . .	402	416	393	410	2	1	6	4	2	1	26	27
Central Provinces .	2,502	1,909	2,397	1,741	4	9	13	16	4	5	13	10
Lower Burma .	342	309	303	216	11	30	57	67	17	20	7‖	7
Assam . . .	506	300	485	294	4	2	18	26	5	8	15	9
Coorg . . .	201	201	116	194	42	3	31	19	9	6	83	83
Ajmere . . .	139	139	138	139	1	...	4	5	1	2	100	100
Total .	7,918	6,765	7,045	6,219	11	8	16	18	5	5	...	18
Berar . . .	1,063	1,044	1,044	999	2	4	7	6	2	2	100	94
Total Bengal Presidency . .	8,981	7,809	8,089	7,218	10	8	15	16	5	5	...	19
Madras¶ .	3,169	2,569	2,888	2,452	9	5	12	14	4	4	20**	60
Bombay . .	10,098	9,773	8,314	8,817	18	10	·633	·200	·19	·06	.. ††	68
Grand Total	22,248	20,151	19,291	18,487	13	8	...	8	...	2	...	37

* Includes 32 square miles of proposed Reserves in the Singhbhoom Sub-division.

† Includes 31 square miles of proposed Reserves in the Singhbhoom Sub-division.

‡ Fire-protection in the Central Circle extended over *Protected Forests* as well as Reserves, and in that Circle the area attempted to be protected included tracts for which no special fire-protective measures were taken.

§ In Oudh 63 per cent., in School Circle (taking Leased Forests into account) 78 per cent., in Central Circle (taking Reserved and Protected Forests into account, as done by Conservator) 40 per cent.

‖ *Taungya* areas not included.

¶ Fire-protection was extended to Protected Forests (Reserved Lands) as well as Reserves including Leased Forests, and the area attempted to be protected included tracts for which no special fire-protective measures were taken.

** Taking Reserved Forests and Reserved Lands into Account.

†† No comparison possible, as the area attempted in the Northern Circle is greater than that of the Reserved and Protected Forests in that Circle put together.

39. *Bengal.*—The area it was attempted to protect from fire was considerably increased, but, on the other hand, the area passed over by fires also increased considerably, namely, from 12 per cent. of the area protected in 1887-88 to 27 per cent. during the year under review. This increase in the area of failures would appear to be chiefly due to attempts to extend protection too hastily in one Division. At present 35 per cent. of the total area of Reserved Forests are specially protected from fire at an average of R13 per square mile.

North-Western Provinces and Oudh.—There was an increase of 22,700 acres to the area under fire conservancy; and 6½ per cent. of the area attempted to be proceeded was burnt, compared with 5 per cent. in the previous year. The area actually protected diminished in the Oudh and School Circles, and increased by 24,000 acres in the Central Circle. The cost of protection was about the same as in previous years. In the Oudh Circle there were few fires except in the Bahraich and Pilibhit Divisions. The most serious fire of the season was in the Bahraich Division, where 19,200 acres were burnt; but the damage was not great. The other large fire, in which 2,986 acres are burnt, came from the Nepal forests, notwithstanding the representation made by the Government of India to the Nepal Durbar last year. In the School Circle there were two extensive fires in the Dun Division. In the Saharanpur Division the

areas burnt exceeded those of the previous year. Of the 16 fires in this division 12 were evidently incendiary. The most serious fire extended over 20,000 acres. The efforts of the District and Forest authorities to discover the authors of these repeated fires have failed, and strong measures are necessary to put a stop to this very serious and organized mischief.

Punjab.—Special protection from fire was afforded to about 26 per cent. of the total area of gazetted forests, or to 257,515 acres, as compared with 266,108 acres in the previous year. During the year under report fire obtained entry into 5,726 acres, or about 2 per cent. of the above area, as compared with 3,913 acres, or a little over 1 per cent. in the preceding year. Outside these specially protected areas, fires occurred in 11,891 acres of forests for which special fire-protective works are not considered necessary, as compared with 6,410 acres the previous year. In all, out of a total area of 5,955 square miles of lands held in charge by the Department, 27½ square miles, or about 0·5 per cent. of the total area, was burnt, as compared with 16 square miles the year before.

Central Provinces.—A larger area was attempted, the percentage of failures was smaller and the cost was less, than in 1887-88. These results are the more satisfactory as the season was dry and unfavourable, and they appear to demonstrate that the orders contained in the Chief Commissioner's Circular No. 2 of 1888 have been effective in procuring the assistance of the Malguzars in extinguishing and preventing forest fires. The estimate that half the area for which no special protective measures were undertaken escaped fire, though it is only a rough approximation, supports the expectation that forest fires, even outside specially protected areas, may eventually be the exception and not the rule.

The Rules for regulating shooting and fishing in Government Forests may also be expected to have a preventive value. Not a few of the fires of past years were attributable to the carelessness of shooting parties or their attendants.

Burma.—In Lower Burma fire-protection was more successful than in the previous year and young plantations burnt in 1887-88 have in some instances been found not to have suffered permanent injury. Fairly well-stocked plantations will recover with more or less rapidity from the effects of a single fire, and that the more complete the stock the less liable is a plantation to permanent injury; but it is only too clear that in many cases considerable damage, and invariably some retardation of growth, is the consequence.

In Upper Burma it has not yet been found practicable to protect the forests from the fires which in that comparatively dry climate overrun them for months and do immeasurable damage. It is, however, hoped that, as soon as circumstances admit, whatever measures are necessary to secure protection will be adopted. The urgent need for active measures is proved by the Conservator's remarks regarding the present unsatisfactory state of natural reproduction in all the teak forests which have so far been explored. It is stated that the younger classes of teak trees are ill represented, and that seedlings are scarcely to be found.

Assam.—The Department was successful in the protection of the forests from fire; the results are the best of recent years, a very great increase having been made in the area under protection during the year, while the figures of the expenditure under this head show a considerable comparative economy. The area protected was 191 square miles more than in 1887-88, the cost per square mile fell from R26 to R18. This rate is only about half the average cost of fire-protection a few years ago, and taking into consideration the difficulties and the cost of labour in Assam is reasonable.

Coorg.—The protection of the forest, although only six cases of offences against the Forest Law were taken into Court, is far from satisfactory as regards fire-protection. The number and extent of fires are reported to have been disastrous, and it appears very doubtful whether the forest establishments have been kept under proper discipline. It has, therefore, been suggested by the Government of India that the first step should be to punish subordinates whose carelessness has led to the occurrence of fires, and to ascertain whether these serious losses to the State are not primarily due to neglect on the part of the superior Forest Officials to secure efficient precautions. There appear to be grave doubts whether the protecting fire-lines were thoroughly burnt over while no less than ten fires were caused by the men employed to burn the lines; eight crossed the lines from outside. It seems that the inefficiency of members of the establishment was accountable for seven conflagrations, and that more than 32,000 acres were burnt from preventible causes.

Ajmere.—Fire-protection was less successful than usual. There were five fires, involving an area of 466 acres, as compared with two, which spread over 12½ acres, in 1887-88. Only one fire of any importance occurred, and it was extinguished before any real damage was done; 400 acres of inferior grass were burnt and nothing more. About one-ninth of the total forest area were protected from fire without the adoption of any special measures.

Baluchistan.—There was one small fire over two acres which did no great damage. No fires entered the Juniper Forests during the year under review, although no special measures appear to have been taken for their protection.

Andamans.—Fires do not occur in the Andamans Forests.

Berar.—The percentage of the fire-protected area which was burnt was much smaller than in the previous year. The chief failures again occurred in the Wun District. This constant recurrence of fires in one and the same district points either to some defect in the system of protection or to a condition of things which does not prevail elsewhere. The fires cannot be attributable to the wild inhabitants being deprived of certain benefits which they had enjoyed from time immemorial, or the forests of other districts where similar restrictions have been imposed would not be so much more free from fires. The forest area in the Wun District, which is considerable (namely, 863 square miles), is made up of scattered tracts, and the establishment is weak or insufficiently supervised. As the forests in their present unproductive state will not justify any considerable additional expenditure on establishments, their more effective protection must be looked for in the conciliation and co-operation of the people, by which means such satisfactory results have been obtained in the Melghàt Taluk.

Bombay.—The protection of the whole of the area under the control of the Department, as well as some areas under Settlement, was attempted in the Northern Circle, and, although the year was unfavourable, a considerable measure of success was attained at a reasonable cost. In the Southern Circle, the Conservator believes the returns to be unreliable to a serious extent, and the results are not satisfactory. The area specially protected was only about one-fifth of the total area of the Reserved and Protected Forests, and the cost per square mile was more than seventeen times as high as in the Northern Circle. In the Sind Circle it is not said whether the large Unprotected Reserves escape from fires without any special measures being extended to them, and the Conservator of the Southern Circle records his inability to give the areas which ordinarily escape fire without the adoption of special measures. It is not desirable to have areas specially reported on where they represent merely scattered plots of small extent surrounded by deciduous forest through which, but for protective measures, fire would pass. But entire forests or compact parts of forests of considerable extent, in which fire-protective measures are necessary, should be mentioned, and this has not been done.

Madras.—It was attempted to protect a larger area than in the previous year, and the failures were more than proportionately greater.

The cost of fire-protection was less than in the previous year and was not, on the whole, above the average of other similarly situated Provinces. The gradual reduction of the expenditure per acre under this head, which has taken place in Madras in recent years, is a satisfactory feature in the Administration.

III.—Protection from Cattle.

40. It was stated in the last Annual Review of Forest Administration in India that Conservators would be instructed to submit an annual statement showing for each forest the area grazed over and the number of cattle grazed. It has not, however, as yet been found practicable to prescribe such a statement, and the information given in the Reports continues, therefore, to be incomplete, and, in some cases, it is vague and unsatisfactory. A form for recording the information that is required has been proposed in Circular No. 35-F. of the 17th October 1889, and is now being considered. The pasture provided, both free and on payment, for the population, is such an important factor in the economy of the country that it may advantageously be shown in some concise form in every Administration Report.

It is probable that the system of charging a fee for each head of cattle, though this may be difficult to manage and open to abuse, is the surest way of limiting the number of worthless cattle which are allowed to live on in India and deprive more valuable animals of a portion of the available fodder. The Reports generally show that efforts are being made to exclude grazing, where this is considered to be injurious, from all areas set aside permanently for the production of timber. It is only natural that attempts

to close areas of forest and waste, over which flocks and herds have been accustomed to wander, should meet with opposition, and cause, at first at any rate, some discontent, but no closures are effected without full consideration of the requirements of the people in the matter of grazing, and any dissatisfaction caused by these measures will gradually subside as the people become more habituated to the restrictions necessarily imposed on them.

The subject of grazing occupied the attention of the Government of India during the year, and a Circular No. 21-F. of the 12th July 1889 was issued to all Local Governments and Administrations regarding the damage done to forests by sheep and goats, desiring that the question should receive their attention and that the measures taken to deal with the matter should be reported to the Government of India. That Government have expressed their conviction that the grazing of these animals, especially of goats, was incompatible with rational forestry, or even with the preservation of the ordinary bushes and trees of the country, and consider that the areas to be devoted to the growth of forest must be separated from those to be sacrificed to the pasture of browsing animals. The circumstances affecting the separation in question, however, vary so much in accordance with climatic conditions, that the question will have to be considered in each locality on its own merits, due weight being given in each case to the capabilities of the land, and to the advantages of sylvicultural treatment on the one hand, and of pasture on the other.

41. *Bengal.*—The information given in the Conservator's Report with regard to the protection of the forests from grazing is deficient, in so far that it is not stated what areas were grazed over and what areas were closed to grazing, the general reason why they were so closed, and the effect of the measures taken. The Conservator's remarks lead to the impression that sufficient attention is hardly paid to the important subject of protecting the forests from grazing.

North-Western Provinces and Oudh.—The receipts under this head rose from R89,220 in the previous year to R1,02,728 in the year under review. In the Central Circle the area closed to grazing was 27·89 per cent. of the total forest area, in the Oudh Circle 44·59 per cent., and in the School Circle it was 29½ per cent. Throughout the Central Circle grazing is light, and the charges almost nominal, being 5·26 pies per acre.

The steps taken to encourage the use of fodder reserves and to improve the system of cattle-keeping generally are reported to have failed except in Bundelkund. The Oudh Circle forests afforded grazing for 330,754 head of cattle, and the Conservator suggests that this number might be restricted. The damage done by grazing in the School Circle is reported to be considerable in the Saharanpur District.

Punjab.—The following statement shows the areas wholly or partially closed to grazing during the year :—

Closed to all animals throughout the year.	Closed to all animals for a part of the year; but open to all animals for the remainder of the year.	Closed to browsers (only) throughout the year.		Closed to camels (only) throughout the year.		Closed to browsers (only) for a part of the year.		Total area affected.
		Closed to all other animals for a part of the year only.	Open to all other animals throughout the year.	Closed to all other animals for a part of the year only.	Open to all other animals throughout the year.	Closed to all other animals throughout the year.	Open to all other animals throughout the year.	
Sqr. miles.	Sqr. miles.	Sqr. miles.	Sqr. miles.	Sqr. miles.	Sqr. miles.	Sqr. miles.	Sqr. miles.	Sqr. miles.
8	40	218	464	2	3	12	9	1.566

This statement would be more instructive if it distinguished Reserved Forests from unclassed lands under forest control, or, in other words, areas permanently set aside with a view to the production of wood from those areas of which the principal product is grass or fodder.

Central Provinces.—The area closed to grazing is not stated; but it is believed to be less than 1,000 square miles.

While the number of cattle grazed in the Government forests has declined, the receipts from grazing fees have increased, the increment in 1888-89 being over R20,000. The revenue from grazing fees amounted to R4,61,447, or nearly two-fifths of the total forest

receipts. The decrease in the number of cattle is for the most part—and, no doubt, rightly—attributed to the revision of the grazing rates which came into operation in many districts during the year. The Chief Commissioner is of opinion that the rates charged are moderate and in some districts ought to be raised.

It has been suggested by the Government of India that areas, the chief product of which is pasture, should be shown separately from areas which it is deemed expedient to treat primarily with the object of producing timber. The revenue from grazing fees is comparatively very large, and many of the lands which contribute this income are probably unsuited for forest treatment with a view to the production of wood.

Burma.—The injury done to forests in Burma by grazing is of the smallest importance. From Lower Burma it is reported that there are no grazing rights in any of the reserves. A few cattle were pastured in reserves by villagers engaged in teak Taungya plantations, but no grazing fees were levied.

Nothing is recorded on the subject in the Upper Burma Reports.

Assam.—Nothing is recorded for the year on the subject of grazing which in Assam, in view of the vast grazing areas available, is of little importance from a forest point of view.

Coorg.—The information given in the Forest Officer's Report in regard to grazing is somewhat vague, and the Government of India has, therefore, suggested that in future the areas open to grazing for part of the year or throughout the year, as well as the number of cattle or other animals admitted, should be stated.

The sum realized as grazing fees during the year amounted to R1,463. Besides this, grazing was given free to 2,408 head of cattle for one and a half months. The number of cattle grazed in the Reserves during the monsoon was 2,113 head.

Ajmere.—During the year only 16,292 cattle were allowed to graze on payment against 36,259 in 1887-88, as it was not considered advisable to permit more cattle to graze in the Government Reserves. Besides this 1,245 cattle belonging to right-holders were allowed to graze free of charge.

It is suggested by the Government of India that in future a statement should be given showing the areas closed and open to grazing, as well as the number of cattle admitted. It is observed that the value of grass removed by the right-holders is estimated at R67,083, while there was a large increase in the number of tickets for cutting grass.

Baluchistan.—The Reserved Juniper Forests were closed to grazing. The Zarghun Reserve was also closed to grazing from August. The greatest number of cattle for which permits existed at any one period at Sibi was 229. The total receipts for grazing was R1,519 including R947 on account of a tax on camels.

Andamans.—The forests do not require to be protected from cattle.

Berar.—As regards the *Demarcated State Reserves* grazing in any form was only permitted during the monsoon months and in certain districts. The number of cattle thus grazed was 36,013, as compared with 72,959 the year before.

The Conservator states that the consensus of opinion on the subject of "light-grazing" is that as the condition of the South Berar Forests is one of extreme poverty, their improvement is not compatible with grazing at all, because it is impracticable to so regulate grazing as to distribute it equally over a given area and to prevent particular areas being heavily grazed over no matter how limited the number of cattle admitted. Consequently he considers that the principle of "light-grazing" is a mischievous unreality, the application of which to the poor open forests of South Berar has had the worse results.

Orders have, therefore, been issued to put a stop to all grazing within the Demarcated State Forests, except in those cases—very few, it is hoped—where undoubted hardship would ensue to the surrounding populations.

As regards grazing in the District Forests, there is no attempt to protect these tracts from cattle grazing as they are mainly intended for the pasture of cattle.

The number of cattle that paid dues for grazing within this class of forest was 1,395,603 against 1,380,460 in the previous year.

The Conservator also states that the new system of permitting owners of cattle to graze on passes subject to small annual fees, as opposed to the old practice of auctioning the right of pasture to contractors who then charged the people what they liked, has continued to work in the interests of the people, who no longer suffer from the tyranny of a selfish monopoly. But regarded from a departmental point of view the new order of things has burdened the establishment with duties and responsibilities with which, at its present strength, it is not well able to cope.

Bombay.—During the year the treatment of grazing in Government Forests was specially dealt with by the Government of India in conveying its remarks on the Resolution of the Bombay Government reviewing the Report of the Bombay Forest Commission, and the desirability of limiting the numbers of cattle, of fixing the season during which grazing will be permitted, and of closing the forests in rotation for a sufficiently long period was again urged.

In the Reports the areas protected from cattle and those not so protected, or from which it is not desirable or necessary to exclude cattle or sheep and goats, are not given, and no comment in this direction is possible.

The Conservator, Northern Circle, remarks that the revenue from grazing and fodder-grass has increased considerably during the year, being R78,310 over and above the receipts of the previous year, and the steady expansion of this source of revenue which has been going on during the past ten years. The abnormal increase of the year is probably due to closed areas having been opened at the request of the Revenue Officers owing to scarcity of fodder. Improvement in the quality and quantity of grass, which is mainly due to forest conservancy, has also much to do with the expansion of revenue under this head. Much damage, difficult of detection, is caused by herdsmen who lop off the branches so that the cattle may feed on the leaves. This is more especially the case in years like that under report, when the rainfall has been scanty and fodder scarce in consequence.

The Conservator, Southern Circle, states that revenue from grazing was R4,352, more than during the previous year. The increase is mainly due to more stringent orders being issued with regard to the collection of the grazing fees.

Sheep and goats are very numerous in all the eastern forests and are a great hindrance to natural reproduction, as they are only excluded from a portion of the forest area. The very small fee of half an anna, which is charged for the right to pasture one of these animals for one year, encourages their increase within forest-limits, and it is considered that it would be a good plan to raise the fee if it is not thought expedient to exclude them altogether. Under present rules, a goat can be fed for the market, entirely at Government expense, for one year, for half an anna, and it can then be sold for 12 annas or a rupee. For horned cattle, which do much less damage to the forest, two annas a head are paid.

Sind suffered again from a deficiency of rain and the river-side forests were resorted to for grazing in numbers exceeding even those of last year. The chief grazing grounds are in the newly-formed alluvial lands of river-side forests. These tracts not only afford abundant natural fodder for cattle, but such land before it has risen high enough to be fit for the growth of trees of any value is very suitable for the raising of fodder crops. The Forest Department while holding a sufficient area in reserve for grazing, a very important matter where the rainfall is so scanty and precarious, permits crops of this kind to be raised on them, and this adds mmensely to the comfort and prosperity of the pastoral population in the neighbourhood of the Government Reserves.

Madras.—The receipts from grazing fees increased from R1,05,811 to R1,29,855, but in spite of this increase the Madras Government considers that it is evident from the Reports that grazing is still allowed free over a large extent of forest lands while the fees which were charged were very moderate. Attempts were made in North Arcot to induce the ryots to use hay. The presence of cattle is antagonistic to good forestry, in areas set apart for the production of wood, and if cattle owners can be induced to cut and remove the grass, the advantages to them will be even greater than if their animals are allowed to graze while, so far as experience goes, little, if any, harm is done to the forests. At the same time His Excellency in Council also observes that it is undesirable to impose restrictions on grazing too rapidly, and that many of the forests are more needed for pasture grounds than for the growth of forest.

IV.—Natural Reproduction.

42. It was noticed that in many cases the subject of "Natural Reproduction" was dealt with in an unsatisfactory manner in the Reports of Conservators of Forest Circles, and, with a view to remedying this defect, a Circular, No. 31-F., dated 30th September 1889, was issued by the Government of India to all Local Governments and Administrations, requesting that such information should be more clearly and precisely given in the Annual Reports.

As regards the reports under review their general tone would seem to show that the good effects of increased protection from fire and excessive grazing are making themselves felt.

43. *Bengal.*—The remarks of the Conservator regarding natural reproduction are interesting and to the point, and the results reported are generally favourable. The tendency of the *Null* grass to take possession of the ground in the Sunderbuns Forests, where these are overworked, has been noticed, and this has frequently been observed in other forests having a damp soil where the cover overhead has been too much opened out.

North-Western Provinces and Oudh.—In the Central Circle there was a heavy and general fall of sàl seed and an absence of seed in the chìr Forests. Bamboos seeded more extensively than in ordinary years in the Ganges Division and Garhwal; but there was no general seeding in any part of Kumaun. In Oudh the natural reproduction in the closed forests is very good, except in parts of Bahraich and Gonda. The protection from fire is everywhere most marked in an improvement in the soil, the existing young growth, and the appearance of numerous seedlings. In the School Circle the sàl tree seeded fairly well and the chìr seedlings all over the hills are doing well, especially where protected from fire and grazing. In many of the raos, shisham seedlings are appearing and doing excellently under the shelter of fire protection. The reproduction of the kharsu oak is also satisfactory. The seedling of deodar was not general, and as in the Central Circle there was no chìr seed.

Punjab.—Generally speaking natural production appears to have been good, but the remarks made in the Conservator's Report are somewhat too general to be of much service. Some interesting experiments with regard to the reproduction of *jhand* by root-suckers are recorded which, it has been suggested, should be continued with a view to ascertaining the cost of applying the method on a large scale.

Central Provinces.—Natural reproduction is favourably reported upon; and protection from both fire and grazing is shown to have a markedly good effect.

Burma.—As regards Lower Burma nothing special is recorded for the forests in the Pegu Circle. With regard to the Tenasserim Circle, the Conservator reports that little or no natural reproduction of teak seems to have taken place during recent years in either the Attaran or West Salween Divisions. As regards the East Salween Division the Reports are more favourable. As regards Upper Burma, the Conservator reports that, from what is now known of the teak forests, there can be no doubt that natural reproduction is everywhere in a most unsatisfactory state; not only are the younger classes of trees ill represented, but seedlings are scarcely to be found. It is possible that this absence of seedlings is due to the opening out of the forest by the removal of such large numbers of marketable trees, which has induced a dense undergrowth and increased the intensity and destructiveness of the annual fires. The same want of young growth is, however, noticeable in the almost unworked forests of the Chindwin, and it is highly probable that fires are sufficiently destructive to account for the absence of young growth under all conditions, as these destroy not only the plants, but the seeds which have fallen. In the forests on the Meza drainage, patches of young poles are not met with, but these have followed on the removal from an almost pure teak forest of immature trees cut down for consumption in Upper Burma, and are to a great extent coppice shoots.

When reserves have been sanctioned and the limits of the permanent forest estates are known, the first and most important measure for their improvement must be their protection from fire on a large scale.

Assam.—The natural regeneration in all the Assam Forests is profuse, and could not be otherwise in a climate so favourable in every respect to the growth of trees and plants in general. It is also satisfactory that sàl, the most valuable timber tree of the Province, reproduces itself naturally even better than other species.

Coorg.—Generally speaking natural reproduction would appear to be unsatisfactory in Coorg.

The causes which check it would appear to be excessive grazing, fires, or too dense undergrowth, all of which are preventible.

Ajmere.—It is reported that natural reproduction of indigenous trees, especially in the areas closely protected, is on the whole satisfactory in both the Ajmere and Merwara Reserves.

Baluchistan.—The closing to grazing of parts of the Ziarat Juniper Forests promises to have a good effect on the natural reproduction of Juniper and pistachio, which is difficult to obtain in the dry climate of Baluchistan. A number of seedlings of both species come up every year, the majority of which dry up for the want of rain, and it is only at rare intervals that a favourable year for them occurs.

Andamans.—The maintenance and improvement of the Andamans Forests is a simple matter, provided that where fellings are being carried on sufficient attention is paid to the

requirements as regards the natural reproduction of the more valuable species, especially the Padouk. It is to be regretted that little or no information has as yet been obtained with regard to the manner in which this species propagates itself naturally and the precautions required to ensure its maintenance in the areas felled over.

Berar.—The subject of natural reproduction in the Demarcated State Forests was very fully dealt with by the Conservator in an appendix to his Report. He states that the Reports of the Divisional officers indicate a monotonous sameness of conditions in regard to a deteriorated stock, an impoverished soil, and a general absence of successful natural reproduction.

This strengthens the opinion of the Government of India that, for many years to come, the chief features of forest management in Berar must be complete rest and long-continued protection from fire and grazing.

Bombay.—The Conservator, Northern Circle, remarks that concurrently with the establishment of fire-protection natural reproduction has made decided and satisfactory progress. Thus in the Eastern Deccan Ranges which were the centres of famine during 1877-78, and where the rainfall is generally uncertain and often deficient, the increase of game, deer especially, is safe evidence of the growth of cover, showing that the reboisement of denuded lands, which have been constituted Reserved Forest since the famine year, is fast becoming an accomplished fact.

The Conservator, Southern Circle, remarks that the only obstacles to natural reproduction by seed in the greater part of the forests of Kanara and other districts of the forest zone are fires and, in a less degree, grazing. It is only in evergreen groups that seedlings are able to make way from the first against fires. Innumerable seedlings come up during the rains and are burnt down during the hot weather. Where the jungles consist chiefly of coppice, the young shoots, although retarded in their growth and damaged by fires, are not easily killed outright. In the drier areas where the forests consist mostly of scrub and the conditions are all unfavourable to natural regeneration by seed, thorns and cactus are almost the only species that can propagate themselves in open ground by seed, but, where thorny cover is pretty dense, it has been found that tree-species, which do not make much demand on the soil, and stand shape when young, such as *nim* and sandal, can be got to grow by simply sowing their seeds broadcast amongst the bushes.

In Sind it is only in the river-side forests and in those which are capable of being properly irrigated that natural reproduction can be counted on within a measurable time. In these cases it is reported as having been satisfactory during the year.

Madras.—The results of conservancy is reported to be favourable in the dry districts, and rapid reproduction is rapidly obtaining in all the protected areas in the more favoured climate. These satisfactory results are attributed to increased protection from fire and the inclusion of cattle, and this agrees with the experience gained in other parts of India.

V.—Sowing and Planting.

44. The area of plantations and cultural operations undertaken during the year is exhibited in the following table:—

Province.	Area in acres.															
	At commencement of the year.				Added during the year.				Excluded during the year.				Balance at the close of the year.			
	Regular Plantations.	Cultural Operations.	Taungyas.	Total.	Regular Plantations.	Cultural Operations.	Taungyas.	Total.	Regular Plantations.	Cultural Operations.	Taungyas.	Total.	Regular Plantations.	Cultural Operations.	Taungyas.	Total.
Bengal	2,754	957	...	3,711	142	24	...	166	...	...	...	...	2,896	981	...	3,877
North-Western Provinces and Oudh.	2,772	3,324	...	6,096	100	66	...	166	...	538	..	538	2,872	2,852	...	5,724
Punjab . . .	14,006	5,333	...	19,339	532	1,519	...	2,081	437	828	...	1,265	14,131	6,024	...	20,155
Lower Burma . . .	3,847	3,321	13,455	20,623	21	3	2,664	2,688	...	...	...	...	3,868	3,324	16,119	23,311
Upper Burma . .	...	·24	...	·24	...	·12	...	·12	...	...	...	...	...	·36		·36
Assam	1,389	141	...	1,530	74	7	...	81	...	...	...	...	1,463	148	...	1,611
Coorg	1,342	10	...	1,352	108	...	...	108	22	...	...	22	1,428	10	...	1,438
Ajmere	*451	...	...	451	52	...	...	52	14	...	...	14	489	...	...	489
Baluchistan . . .	51	43	...	94	93	...	...	93	...	...	...	...	144	43	..	187
Andamans . . .	59	...	...	59	...	...	...	...	...	...	...	...	59	...	...	59
Total .	26,671	13,129·24	13,455	53,255·24	1,152	1,619·12	2,664	5,435·12	473	1,366	...	1,839	27,350	13,382·36	16,119	56,851·36
Berar	1,459	10,632	...	12,091	...	1,139	...	1,139	50	353	...	403	1,409	11,418	...	12,827
Total Bengal Presidency .	28,130	23,805·24	13,455	65,346	1,152	2,758·12	2,664	6,574·12	523	1,719	...	2,242	28,759	24,800·36	16,119	69,678·36
Madras	19,311	‡4,339	†32,598	55,948	549	616	†15	1,180	623	333	6,850†	7,806	18,937	‡4,622	†25,763	49,
Bombay	6,819	167,907	...	174,726	856	44,865	...	45,721	...	4,530	...	4,530	7,675	208,242	...	215,917
Grand Total .	53,960	196,007	46,053	296,020·24	2,557	48,239·12	2,679	53,475·12	1,146	6,582	6,850	14,578	55,371	237,664·36	41,882	334,917·36

* Includes 22 acres wrongly entered under "Cultural Operations" in last year's statement.
† These are Topes.
‡ Besides 100 miles of channel banks.

45. *Bengal.*—The plantation work done during the year was unimportant, and only comprised the addition of 142 acres to the area under Regular Plantations and of 24 acres to that under Cultural Operations, R6,887 having been expended on this work and on the filling in of blanks and the up-keep of existing plantations.

North-Western Provinces and Oudh.—The expenditure on all three Circles on artificial reproduction amounted during the year to R7,287 only. In the Central Circle artificial reproduction in regular plantations has been confined to the hill forests, where the demand is outgrowing the resources. Fair success has been attained, and no unnecessary work has been attempted. In the Oudh Circle the sissu plantations in the Gorakhpur Division have been increased and are doing well, except the Madhaulia Plantation. In the School Circle the sissu plantations are not thriving in some parts, nor are the sál plantations in the Dun, and most of these will be abandoned. In Jaunsar the blank areas in the nurseries were replanted and some new nurseries were made. Several specimens of the Scotch pine have been planted and are doing well.

Punjab.—During the year 562 acres of "Regular Plantations" were re-stocked by planting and sowing. This area comprised mainly the sowings within the Cantonment of Dagshai, where 360 acres were treated. An area of 437 acres has, however, been struck off during the same period, making the net increase to the area of Regular Plantations 125 acres only. Cultural Operations extended over an area of 1,519 acres, but, as during the same period 828 acres of previous failures were struck off the books, the net gain to the area under this form of cultivation has only been 691 acres.

Central Provinces.—Artificial reproduction is not called for on any considerable scale, and the limited sowings and plantings reported appear to be attended with disappointing results.

Burma.—In Lower Burma the area of Regular Plantations was increased by the addition of 21 acres to the Magayi Plantation, while teak was planted in Taungya clearings to the extent of 854 acres in the Tenasserim Circle and 1,810 acres in the Pegu Circle. These satisfactory results bring the area under Taungya Plantations up to 16,119 acres, of which 4,678 are in the Tenasserim Circle. The area of new plantings in 1888-89 exceeded the area of new plantings in 1887-88 by 55 acres in the Tenasserim Circle, and by no less than 833 acres in the Pegu Circle. This considerable expansion of Taungya Plantations, by an area of more than 4 square miles, is more than has ever before been recorded in any one year. Nothing has yet been attempted in Upper Burma with regard to artificial re-stockings.

Assam.—The greatest amount of success was obtained in the rubber plantations, which were extended by 74 acres, and experimental sowings of some of the more valuable Assam timber trees were continued with the view of eventually improving the composition of the forests. The efforts made to induce the people to grow these trees with their crops in *jhumed* areas were not on the whole successful. These efforts will, however, it is hoped, be persevered in, as, owing to the scarcity of labour in Assam, there are at present no other means by which the vast areas of Unreserved Forests in the Province can be improved on a large scale, or the injury done to them by *jhuming* be counterbalanced.

Coorg.—The total area under Regular Plantations in Coorg is 1,428 acres, of which 850 acres are teak, 395 acres are sandal, and the rest miscellaneous species grown for fuel. The areas planted during the year were as follows:—

	Acres.
Teak	49
Sandal	38
Fuel	10
Bamboo	11
TOTAL	108

Ajmere.—In all 52 acres were added to the various small areas treated as Regular Plantations. These aggregated 489 acres at the close of the year after allowing for the exclusion of 14 acres, the reasons for which are not given.

Better results would probably be obtained by concentration. The supervision and protection, if properly carried out, of 21 small plantations or nurseries, with areas from 3 to 80 acres, are likely to involve an outlay out of all proportion to the results.

Baluchistan.—The operations commenced in the preceding year for creating a fuel and fodder reserve in connection with the Shebo canal were continued on a small scale. The total area cultivated was 93 acres, and the supply channels were made over another 77 acres.

The money expended was R4,878, but of this a great proportion was spent in building a rest-house and out-houses for the establishment.

A further portion of the swampy grass land was trenched and planted in the Zangi Lora Plantation. Babul and shisham seed were sown in various favourable places in the Rakhs. The areas planted in previous years are reported to be doing well.

Berar.—Plantations and cultural operations in Berar have been attended with but little success, and in many instances they have not advanced beyond the experimental stage. This ill-success, it is believed, is to a great extent due to the fact that these works of improvement have been carried on without system or Working-Plans, or, in the absence of the latter, preconsidered Plans-of-Operations, and that the results attained have not been recorded in a complete manner.

Bombay.—In the Northern Circle Planting operations have now been extended over 309 square miles with what results is not very clearly stated. During the year further operations were undertaken in all the districts of the Central Division; but, owing to the scanty rainfall, they were not particularly successful. Artificial reproduction is up-hill work in the Deccan and the results are very discouraging.

In the Southern Circle no very marked progress seems to have been made. But the Conservator states that, as a means of maintenance and improvement, importance is attached to the filling-up by sowing of gaps caused by fellings in selection-worked forests. The most suitable men to employ for this purpose are, he states, the guards, who should know where gaps have occurred, and can afford the time to attend to desultory work of this nature. In this manner, it is thought that an immense amount of useful work can be done by the guards without in any way interfering with their other duties.

In Sind there is nothing that can be fairly classed under Plantings beyond this sort of scattering of tree seed, and sowing it in land given out for cultivation for a season. An area of 293 acres was treated under this Plan, 190 maunds of babul and kandi seed being scattered.

It would be satisfactory to learn what measure of success has resulted from these sowings, but this has not been reported. Experience goes to show that very little can be expected from desultory work, such as is proposed. If there are blanks to be re-stocked, the work must be undertaken with system and on a considerable scale.

Madras.—The areas of plantations, topes, and tracts in which natural reproduction has been aided by cultural operations underwent considerable modifications, which are shown in the following form :—

Class.	Area in acres.			
	At commencement of the year.	Added.	Excluded.	At close of the year.
Plantations	19,011	549	623	18,937
Cultural Operations	4,339	616	333	4,622
Topes	32,598	15	6,850	25,763

The expenditure amounted to R32,814 in the Southern Circle and R17,934 in the Northern, against R29,968 and R19,634 respectively in 1887-88. The bulk of the expenditure was as usual on the teak plantations at Nilambur and the blue-gum plantations on the Nilgiris.

VI.—Thinnings and other Improvement Fellings.

46. The amount of work done under this heading would appear to be small and inadequate when the large areas to be dealt with are considered. The Reports on the subject in most of the Forest Circles are again meagre and insufficient.

47. *Bengal.*—Improvement fellings (cutting of creepers) were carried out over an area of 45 square miles at a total cost of R849.

North-Western Provinces and Oudh.—Very little was done as regards the cultural operations of thinning and creeper cutting, &c., and the cost of what was done was excessive. In the Central Circle creepers were cut over 30 square miles; in Oudh under 12 square miles were so treated, and in the School Circle some 11 square miles were subjected to improvement fellings with a view to the amelioration of the existing crop. It has been pointed out to the Local Government that endeavours should be made to extend these operations over larger areas, and at the same time to reduce their cost.

Punjab.—Little has been recorded with regard to improve fellings and similar cultural operations. The cutting out of inferior species is one of the most potent methods of improving forests in India, and merits special attention in connection with the treatment of Deodar Forests in the Himalayas. The Government of India has suggested that this subject should be more fully dealt with by the Conservator in future Reports.

During the year R3,785 only were expended on thinnings and other improvement fellings.

Central Provinces.—The cutting of creepers and the weeding out of inferior kinds of trees, with the object of increasing the proportion of the more valuable species in the stock, have been carried out without system and over too limited areas, considering the vast extent of forest to be dealt with. Such operations and improvement fellings will, it is to be hoped, be soon regulated by Working-Plans.

Burma.—In Lower Burma the Taungya Plantations of the past three years have been weeded, and in the East Salween Division some of the older plantations have been cleared of over-growth.

Nothing was attempted in the Upper Burma Forests.

Assam.—Climber cutting in the Assam Forests is an expensive work of the greatest importance, as the huge climber to be dealt with not unfrequently causes the boles of sál trees to become distorted like a screw, and requires repeated cutting to prevent such damage. The work done in this direction during the year under report only extended, however, to about 13 square miles, at a cost of about R26 per square mile.

The question of improving the growing stock by the removal of inferior species received special attention. The result is, as was expected, that the great abundance for the present of inferior wood in the Unclassed State Forests which, as a rule, are much nearer the markets than the Government Reserved Forests, and the very small demand there is for such inferior wood, render the removal of it by purchasers, in consideration of receiving it free, impracticable for the present in the Valley Districts.

Coorg.—The cutting of creepers and improvement fellings were carried out over an area of 765 acres, at a cost of R426.

Ajmere.—Little or nothing is recorded with regard to cultural operations, such as improvement felling, and the Government of India has directed that more detailed information should be given on this subject in future Forest Reports relating to Ajmere.

Baluchistan.—Nothing is recorded in connection with cultural improvements in the forest.

Andamans.—Nothing is recorded and nothing appears to have been done during the year with regard to cultural improvements in the forests.

Berar.—Nothing would appear to have been done in Berar in the year under review in this connection.

Bombay.—There is nothing of importance to record in connection with the Bombay Forests with regard to this most important branch of forest work.

Madras.—Improvement fellings, when the large area under forest management in Madras is considered, seem to have been made on an altogether insufficient scale. The apparent neglect of this inexpensive means of improving the condition of the forests is to be regretted.

CHAPTER III.

WORKING AND YIELD.

48. The outturn of the various classes of forests, so far as it has been possible to ascertain this from the Reports, is exhibited in the following statement.

It is again to be regretted that in some Circles and Provinces no attempt is yet made to estimate the total outturn of fuel and timber reduced to one common denomination of cubic feet solid. Attention is again called to the rule on the subject contained in the Forest Department Code, as the omission renders it impossible to give in a complete form a general statement of the outturn from all the forest lands under the control of the Department.

In Madras, the outturn is still given in *tons* of apparently varying values, and it is, therefore, considered unsafe to accept the figures given. In Bombay, owing to the variety of denominations used, no comparison as regards the yield is possible.

It is essential that the outturn of timber and fuel should in all cases be reduced to its estimated equivalent in cubic feet solid, and that the money value of all other produce should be shown in the returns.

Outturn.

Province.	Reserved Forests.			Protected Forests.			Unclassed Forests.			Average outturn per square mile. Reserved Forests.			Protected Forests.			Unclassed Forests		
	Timber and Fuel.	Bamboos.	Minor produce.	Timber and Fuel.	Bamboos.	Minor produce.	Timber and Fuel.	Bamboos.	Minor produce.	Timber and Fuel.	Bamboos.	Minor produce.	Timber and Fuel.	Bamboos.	Minor produce.	Timber and Fuel.	Bamboos.	Minor produce.
	C. feet.	No.	R	C. feet.	No.	R	C. feet.	No.	R	C. feet.	No.	R	C. feet.	No.	R	C. feet.	No.	R
Bengal	20,673,385	4,602,096	72,930	6,619,956	3,881,519	1,98,428	500,163	10,933,934	10,313	4,145	923	15	2,923	1,714	88	124	2,711	3
North-Western Provinces and Oudh . .	9,131,785	17,638,030	§2,30,408	663,358	70,140	3,451	93,523	134,060	2,594	2,539	4,905	64	9,614	1,016	50	708	1,016	20
Punjab	8,819,583	647,507	1,01,456	4,062,520	...	1,47,789	30,156,759	47,753	4,32,178	5,742	422	66	8,061	...	293	7,703	12	110
Central Provinces. .	6,600,066	11,000,689	6,56,849	...	...	...	...	...	...	335	558	33	...	...	...	...	...	...
Lower Burma . .	1,270,897	2,028,450	34,334	...	...	...	7,466,382	...	1,17,527	249	397	7	...	...	...	[Area not known.]		
Upper Burma . .	...	...	...	8,122,916	10,694,956	66,186	...	...	...	...	...	...	1,002	1,320	8	...	...	...
Assam	1,868,759	1,519,767	3,592	441,960	1,244,022	4,072	3,217,324	736,863	50,056	542	441	1	472	1,328	4	570	131	9
Coorg	*111,823	234,390	2,692	...	...	10	†	4,275	...	451	945	11	...	...	...	...	14	...
Ajmere	227,480	...	70,980	...	...	...	...	...	...	1,637	...	511	...	...	...	...	...	...
Baluchistan . . .	...	...	...	...	...	...	‡9,110	...	585	...	...	...	...	...	...	234	...	15
Andamans . . .	...	...	...	...	...	...	1,399,465	362,385	1,028	...	...	...	...	...	...	[Area not known.]		
Berar	135,119	1,753,144	11,181	...	...	...	1,112,624	1,107,976	39,756	128	1,655	11	...	...	...	360	358	13

* In addition, 439 trees and 2,448 cart and head loads of fuel. Cubic contents not given.
† 123 trees and 8¼ cart loads of timber, and 12,515 cart and head loads of fuel. Cubic contents not given.
‡ In addition, 684 pieces of wood and 3,800 maunds of firewood.
§ Includes R186 on account of bamboos (number not given) in the Oudh Circle.

The forests in the Madras Presidency yielded 18,668,216 cubic feet of timber and fuel, and R5,48,939 worth of minor produce (including bamboos). Dividing these figures by the 16,955 square miles under the Forest Department, a proportion is obtained of 1,101 cubic feet and R32 per square mile respectively.

49. *Bengal.*—The outturn of timber and fuel is recorded as 27,793,504 cubic feet, as compared with 26,041,197 cubic feet in the previous year; and the value of the minor forest produce removed was R3,42,047, as against R3,03,506 in the previous year.

There was a considerable increase in the quantity of fuel and bamboos removed under free grants. This was due to the relaxation of rules and to concessions made in the Pooree District in Orissa, where a general scarcity prevailed. The increase under free grants caused a decrease in the produce removed by purchasers.

The total outturn of timber and fuel per square mile from all classes of forests was 2,463 cubic feet, as compared with 2,323 cubic feet in the previous year. The Reserves yielded 4,145 cubic feet per square mile.

North-Western Provinces and Oudh.—Timber to the amount of 4,246,000 cubic feet, fuel to the amount of 5,639,000 cubic feet, and minor produce to the value of R3,36,482 were removed from the forests during the year. For the previous year the corresponding figures were: timber 5,108,000 cubic feet; fuel 6,281,000; and the minor produce R3,47,392. These figures include grants of produce to free grantees and right-holders, and both the amounts and value of the produce thus given are uncertain. Compared with the figures of 1887-88 the output of timber by Government agency was smaller in all three Circles; but that of timber removed by purchasers was greater in all but the School Circle. The removal of fuel by Government agency increased in the Central and decreased in the Oudh and School Circles; removal by purchasers increased in the School and decreased in the Central and Oudh Circles. In other words, there was a diminution in the output both of timber and fuel, and the most marked features of the year were the continued substitution of private for Government agency in the timber operations of the Oudh Circle, and the development of Government agency in the fuel business of the Central Circle. The last is explained by an increase in the Commissariat demand at Ranikhet; the former is only a continuation of a process which has been long at work, and for which the reasons become more and more sufficient.

Punjab.—The outturn of timber and firewood, consequent on less extensive fellings, was less than in the previous year by 417,502 cubic feet. Consumers and purchasers removed on payment 1,032,913 cubic feet more than in the previous year, while 87,085 cubic feet more than in 1887-88 were granted free. This increase of free grants is, however, apparent only as it mainly represents grants not brought on the forms in previous years. Similarly the timber and produce removed by right-holders shows a marked increase in consequence of certain undemarcated State lands being treated for the first time as under the control of the Department. It would appear that the people somewhat abuse the right to free timber by considerable waste in its use, and it has been suggested by the Government of India that it would seem desirable to adopt measures to prevent this.

Central Provinces.—The quantity of forest produce of all kinds cut or collected departmentally was considerably greater than in the previous year. The increase was chiefly in timber supplied in the form of sleepers to the Railway Companies. The estimated quantities of produce removed by purchasers shows a large apparent decrease under the head of timber. It is explained that the quantities per load were over-estimated last year, and that there was at the same time a smaller demand in 1888-89. This, it is supposed, was due to the revision of the scale of charges for forest produce, which has been effected simultaneously with the revision of the grazing rates. The natural effect has been a temporary suspension of demand, but the latter will probably soon re-assert itself. In the opinion of the Chief Commissioner the rates are in themselves most moderate and ought to have been raised years ago.

Burma.—In Lower Burma the quantity of timber worked out of the forests was considerably in excess of that extracted in the previous year. The outturn from the Tenasserim Circle was greater by nearly 11,000 tons, while that from Pegu exceeded the yield of the previous year by more than 24,000 tons. There was a falling off in Cutch revenue from trees outside Reserves, but this has long been expected; and it is to be regretted that it has hitherto been found impossible to take earlier and adequate measures to meet the time when the supply from open lands would be exhausted.

In Lower Burma girdling was carried out by Government agency only, and during the year under review 25,894 teak trees were girdled by departmental agency, as compared with 26,500 trees girdled by lessees during the previous year. The large increase in the quantity of material extracted from the forests is satisfactory, and is due chiefly to work in the forests having been facilitated by the progress made in the restoration of order in Upper Burma.

Assam.—The quantity of produce worked out departmentally from the Assam forests is for good reasons, insignificant, but there has been a steady increase during the past few years in the quantities removed from the forests by purchasers and local consumers. The increase in

the outturn is, however, to a certain extent merely nominal, and especially during the past year, as compared with the previous year, the total outturn of each class of produce and in the value of the minor produce is more apparent than real, as the greater part of this outturn consisted of produce granted free to ryots for home-consumption, the estimates of which are, it is admitted, exceedingly rough. Eliminating this produce, the quantities removed by purchasers or worked out departmentally was greater, in round numbers, by 111,000 cubic feet of timber and 384,000 bamboos, while 20,000 cubic feet less of fuel and R2,500 worth of minor produce was removed.

Coorg.—The forms showing the outturn have been again irregularly prepared, but are sufficient to show that this is still small relatively to the area under control. The Reserves furnish nearly all the timber, bamboos, and minor produce consumed, while the Unclassed Forests supply most of the fuel. Many more trees were felled by Government agency than in the previous year, the numbers in 1887-88 being 1,739, as compared with 2,827 trees in 1888-89; while 21,995 tons of sandal wood was sold against an average for five years of 27,279 tons.

Ajmere.—The estimated outturn of fuel was 227,480 cubic feet (of which 21,300 were removed by Government agency), and the sale of minor forest produce realized R4,000. In addition, free grants of standing wood were made, of which no estimate is given, although this is prescribed by the Forest Code.

Baluchistan.—The outturn in timber and firewood was very much less than that of the previous year. This is explained by less firewood having been sold from the Sibi Depôt, by little wood having been required for Railway works, and by no firewood having been brought into Quetta for sale. Now that the Railway has ceased to sell firewood to the public at rates below cost price—an arrangement that could have no permanency—the demand will have to be met from other sources, and the future fuel supply of Baluchistan, and the part which the Forest Administration of that Province may be required to take towards ensuring that supply permanently, must shortly be considered.

Andamans.—The outturn from the forests was greater during the year under review than in the previous year, chiefly owing to the greater quantities of produce removed by District officers. The quantity of material removed by purchasers was very slightly less than in the previous year, while the quantity of timber worked out by Government agency was considerably greater, being 217,000 cubic feet, as compared with 178,000 cubic feet the year before. There was no exportation of Padouk timber to London during the year, but a cargo was ready for shipment as soon as that despatched in the previous year has been disposed of. The greater part of this shipment was sold off at satisfactory prices since the close of the year.

Berar.—It will be seen from the general statement that there has been an increase in the produce of all kinds removed from the forests, as compared with the previous year.

No comparison of the yield from each forest or with that from other forests is possible, as the outturn is still shown in different denominations. It is explained that the larger portion of the timber yield is not measured, and that, therefore, the outturn cannot be given in cubic feet.

The outturn of the forests in all the provinces under the Government of India is now given in cubic feet, and it would seem that this system should also be possible in the Bombay Presidency. Where the timber is sold standing, a fairly correct estimate can be made without much labour by applying carefully worked out reducing factors to the trees, poles, rafters, or *khandis* of firewood; and the figures so obtained need be in no sense hypothetical or misleading.

Madras.—The outturn from the forests which had decreased in 1887-88 again increased during the year under review. The forests actually yielded 3,214,977 cubic feet of timber and fuel, and R27,411 worth of minor produce, more than in the previous year. This gives grounds for satisfaction, but it is observed that there has been a steady decrease in certain districts.

The bulk of the produce was removed by private agency, but considerable departmental work was done in the Northern Circle in respect of timber and fuel, and in the Southern Circle in the case of minor produce. The cost of extracting timber and firewood was higher in the Southern than in the Northern Circle, but there was improvement in both Circles in the year to which the Report relates. The value of the free grants made during the year was R9,366, but this includes two items, amounting to R5,000, which seems to be mere estimates of doubtful accuracy.

CHAPTER IV.

FINANCIAL RESULTS.

50. The Receipts and Surplus of the various provinces during the year under review, compared with the averages of the preceding five years, are as follows :—

Province.	Revenue.		Surplus.		Deficit.		Proportion of Surplus to Gross Revenue.	Net Revenue per square mile of land under control of Forest Department.
	1888-89.	Average for preceding five years.	1888-89.	Average for preceding five years.	1888-89.	Average for preceding five years.		
	R	R	R	R	R	R	Per cent.	
Imperial . . .	4,017	16,044	...	...	82,182	...	...	...
Bengal . . .	6,76,907	6,34,869	3,00,637	2,38,214	...	...	44	27
North-Western Provinces and Oudh .	14,62,802	14,93,241	6,18,258	5,35,875	...	...	42	163
Punjab . . .	10,45,768	8,84,832	4,51,888	2,28,608	...	...	43	76
Central Provinces .	11,80,405	10,21,929	5,11,708	5,36,020	...	...	43	26
Lower Burma . .	26,09,305	20,84,336	13,77,361	9,46,429	...	...	53	269
Upper Burma . .	15,70,928	2,02,475*	7,94,799	1,40,805*	...	...	50	98
Assam . . .	3,03,882	2,13,568	93,977	3,981	...	...	31	9
Coorg	1,36,183	1,03,352	56,008	30,476	...	...	41	65
Ajmere . . .	13,574	10,784	...	...	2,102	6,616	...	...
Baluchistan. . .	5,668	10,789	...	...	10,326	5,524	...	...
Andamans . . .	1,06,075	41,370	48,780	9,289	...	...	46	...
Forest School . .	449	384†	...	...	32,512	27,307†	...	..
Forest Surveys (Imperial) . . .	315	151	...	...	21,849	26,081	...	...
Total	91,25,278	67,18,724	41,04,440	26,04,169	...	...	45	63
Berar	4,07,977	3,31,592	2,37,765	1,66,763	...	...	58	57
Forest Surveys (Berar)	...	562	...	...	23,955	35,509	...	...
Total Bengal Presidency . . .	95,33,255	70,50,878	43,42,205	27,46,976	...	...	45	62
Madras . . .	15,15,006	11,88,220	2,94,212	2,07,511	...	...	19	17
Bombay . . .	28,50,190	29,41,896	11,56,228	11,26,042	...	...	41	79
Grand Total .	1,38,98,451	1,11,80,994	57,68,690	40,80,529	...	...	42	57

* Average for two preceding years.
† Average for four preceding years.

The *gross* revenue increased during the year from, approximately, 116½ lakhs during the preceding year to nearly 139 lakhs, which is the highest figure yet arrived at by the Department. The *surplus* revenue also increased from 42 lakhs to nearly 58 lakhs, or by nearly 16 lakhs, and was greater than in

any past year. The surplus for each year during the last five years is shown in the following table:—

Year.	British Territories.				Berar.	Grand Total.
	Bengal Presidency.	Madras.	Bombay.	Total.		
	R	R	R	R	R	R
1884-85 . .	17,86,464	2,70,411	9,96,119	30,52,994	1,10,666	31,63,660
1885-86 . .	22,24,991	2,60,678	15,26,825	40,12,494	1,18,300	41,30,794
1886 87 . .	26,59,603	93,789	10,79,766	38,33,158	1,09,736	39,42,894
1887-88 . .	26,84,462	2,45,708	10,88,572	40,18,742	1,81,180	41,99,922
1888-89 . .	41,04,440	2,94,212	11,56,228	55,54,880	2,13,810	57,68,690

51. This rapid increase in the surplus revenues is no doubt a gratifying feature in the Forest Administration of India. But it should be clearly understood that a mere increase of revenue does not of itself prove that the system of management in force is satisfactory, and circumstances point to the fact that in the desire to increase the surplus revenues the due development and permanent improvement of the forests, and their maintenance in the highest state of production, are not being sufficiently attended to.

It will be seen from the following statement, which has been compiled from Form No. 62 appended to the Annual Reports, that during the year under review, out of a total sum of R88,55,000 representing the profits derived from the management of the forest lands in India, only R27,81,000, or 31 per cent. of those profits, were devoted to the improvement and maintenance of these lands, while R60,74,500, or 69 per cent., were paid into the public Treasuries:—

Province.	Total Receipts.	Expenditure on timber and other works connected with the realization of the produce.	Balance, or Gross Revenue for the year.	Portion of Gross Revenue		Percentage of total Gross Revenue	
				Invested in the maintenance and improvement of the forests.	Paid into the Treasury.	Invested in the forests.	Paid into the Treasury.
	R	R	R	R	R		
Bengal . . .	6,76,907	2,01,227	4,75,680	1,66,942	3,08,738	35	65
North-Western Provinces and Oudh .	14,62,802	5,49,408	9,13,394	2,89,341	6,24,053	32	68
Punjab . . .	10,45,768	4,41,054	6,04,714	1,51,868	4,52,846	25	75
Central Provinces .	11,80,405	3,71,578	8,08,827	2,28,021	5,80,806	28	72
Lower Burma . .	26,09,305	10,11,573	15,97,732	1,69,149	14,28,583	11	89
Upper Burma . .	15,79,928	6,61,362	9,18,566	1,23,767	7,94,799	13	87
Assam . . .	3,03,882	86,732	2,17,150	1,23,173	93,977	57	43
Coorg . . .	1,36,183	50,147	86,036	30,028	56,008	35	65
Ajmere . . .	13,573	5,647	7,926	10,029	*Nil.*	126	*Nil.*
Baluchistan . .	5,668	7,565	1,897	8,429	*Nil.*	...	*Nil.*
Andamans . .	1,06,075	56,959	49,116	336	48,780	1	99
Total .	91,20,496	34,43,252	56,77,244	13,01,083	43,76,161	23	77
Madras . . .	15,15,006	5,88,020	9,26,986	6,28,654	2,98,332	68	32
Bombay . . .	28,50,190	8,92,197	19,57,993	7,96,926	11,61,067	41	59
Berar . . .	4,08,192	1,15,038	2,93,154	54,257	2,38,897	18	82
Grand Total .	1,38,93,884	50,38,507	88,55,377	27,80,920	60,74,457	31	69

In European countries it seldom happens that the amount paid into the Treasury is more than, at the outside, 50 per cent. of the profits derived from the State forests, the balance being spent in maintaining them or in permanent

improvements which go to enhance their capital value. Assuming that it is not expedient in India to divert a larger percentage of the profits from the forests into the Treasury than in Europe, the total sum expended on the maintenance and improvement of the forests during the year under review would amount to R44,27,688, instead of R27,80, 920, the sum actually spent.

It is hardly necessary to state that no absolute rule can be adopted, because in many provinces or districts there are large forest areas which, although they yield nothing, require to be protected at no inconsiderable expense; but, broadly speaking, the experience of other countries may be accepted as a guide, and a larger percentage of the income should be devoted to any really useful purpose. For instance, forests which are not being worked may require to be surveyed and demarcated, while forests which are fully organized may require roads to develop them or plantations to improve the composition of their crop.

In this connection it should be noted that in India, owing to the fact that most of the forests cannot be exploited without considerable outlay by Government on the extraction of the produce, much of the forest expenditure appearing in the accounts has really been expended in connection with timber works. The sums so spent are, however, practically *advances*, which are recovered when the produce is sold; and although the system of accounts renders it impossible not to include some of them in the forest expenditure, it is necessary, in order to arrive at a just estimate of the amounts which are being devoted to the maintenance and improvement of the forests, to exhibit such transactions separately. This has been done in the following statement, from which it will be seen that for the past ten years, on an average, 32 per cent. only of the real gross revenue has been expended on the forests, as compared with from 50 to 60 per cent. expended in European countries :—

Average Forest Revenue and Expenditure—India.

Province.	Revenue.			Expenditure.			Percentage of True Gross Revenue spent on the maintenance and improvement of the Forests.	
	True gross Revenue.	Advances recovered on account of Timber Works.	Total Gross Revenue.	Advances made for Timber Works, including a proportion of salaries of general establishment.	Maintenance and Improvement of Forest, including balance of salaries of establishment.	Total Gross Expenditure.		
	R	R	R	R	R	R		
Madras	5,28,131	4,45,070	9,73,201	4,45,070	3,40,714	7,85,784	65	Average of 10 years (1879-80—1888-89.)
Bombay	17,49,665	10,57,571	28,07,236	10,57,571	6,11,243	16,68,814	35	" " 7 " (1882-83—1888-89.)
Bengal	3,94,742	2,24,239	6,18,981	2,24,239	1,49,698	3,73,937	38	" " 10 " (1879-80—1888-89.)
North-Western Provinces and Oudh	6,84,873	6,13,987	12,98,860	6,13,987	2,63,595	8,77,582	39	Ditto.
Punjab	3,96,202	4,28,443	8,24,645	4,28,443	1,64,268	5,92,711	41	Ditto.
Central Provinces	6,93,481	3,33,010	10,26,491	3,33,010	1,59,755	4,92,765	23	Ditto.
Lower Burma	11,18,327	9,23,021	20,41,348	9,23,021	1,48,528	10,71,549	13	Ditto.
Upper Burma	5,77,993	3,60,409	9,38,402	3,60,409	92,731	4,53,140	16	Average of 2 years (1887-88—1888-89.)
Assam	1,42,047	69,924	2,11,971	69,924	1,17,134	1,87,058	82	" " 10 " (1879-80—1888-89.)
Berar	2,10,476	1,05,275	3,15,751	1,05,275	48,012	1,53,287	23	Ditto.
Coorg	70,781	37,316	1,08,097	37,316	31,769	68,085	44	Ditto.
Ajmere	5,043	5,617	10,660	5,617	10,663	16,280	...	Average of 7 years (1882-83—1888-89.)
Baluchistan	5,164	9,205	14,369	9,205	7,924	17,129	...	" " 3 " (1885-86—1887-88.)
Andamans	32,788	47,881	80,669	47,881	700	48,581	3	" " 3 " (1886-87—1888-89.)
Average for all India	66,09,713	46,60,968	1,12,70,681	46,60,968	21,45,734	68,06,702	32	

52. *Bengal.*—The financial results of the year compare favourably with those of 1887-88. The surplus, however, which exceeds that of the previous year by R41,312 and has risen to more than 45 per cent. of the gross revenue, is entirely due to the revenue derived from produce removed by purchasers from forests in the Sunderbuns Division. The Forests of the other divisional charges taken together were worked at a loss of R19,076.

North-Western Provinces and Oudh.—The receipts of the three Circles amounted to R14,62,802, against R12,47,384 in the previous year, and the expenditure was R8,38,749, against R8,29,574. The net surplus was R6,24,053, or R2,06,243 in advance of the last year; and with the exception of the year 1886-87 (R6,53,976), the largest surplus since 1883-84. In the Central Circle there was a large demand for timber, especially for green first class sál: it was so brisk that exports had to be checked in order to keep within the Working-Plans. The demand for railway sleepers is falling off, and the figure now stands normal. The large increase in the Oudh Circle is attributed to the larger sales at Bahramghat, the sale of standing timber, poles, &c., from the strip fellings for the past two years in the Bahraich Division, and to the more lively demand for timber owing to the reduced importations from Nepal. There were also large sales of firewood from the stock in hand. The demand for grass for paper manufacture has also increased, and arrangements were made for its sale to the mills in Calcutta. In the School Circle better prices obtained, especially at the auction sales, during the year, and the demand for timber was great both from the Government for building purposes at Chakrata and for the Canal Department, and from private purchasers. A large quantity of drift timber on the Ganges was sold, and brought in better prices.

Punjab.—The financial results of the year's working have been very satisfactory, the surplus of R4,52,846 being the highest on record, or R42,000 more than that of the year 1886-87. The receipts, however, are due to a considerable extent to the sale of produce felled but unsold during 1887-88, when the income of the Department fell considerably below the average. The net surplus of the two years taken together is R5,61,870, which gives an average of R2,81,000 round, as compared with an average of R2,48,000 during the five years previous.

Central Provinces.—There was thus an increase of R87,036 in gross receipts and of R13,933 in net revenue. The increase is chiefly due to the higher receipts from grazing fees and from forest produce removed by purchasers, the advance in revenue from departmental operations having been counterbalanced by an increased departmental outlay. Much of the excess outlay will, however, it is anticipated, prove remunerative during the current year. The Department, from a business point of view, appears to be improving its position; and with the help of additional establishment various branches of revenue which have not hitherto been properly looked after ought to show better results.

Burma.—In Lower Burma the financial results of the year under review gave the highest net and gross revenues on record, and continue to show satisfactory progress.

The gross forest revenue amounted to R26,09,305, or R3,90,408 more than in 1887-88. In the Tenasserim Circle the receipts from timber worked out by Government were over a lakh of rupees more than in the year before, the quantity of timber brought to depôt being greater and the quality better, while prices also rose as the year advanced. The gross revenue of the Pegu Circle in 1888-89 was R19,39,483. Sales of Government timber during the year of report realized R2,48,691 more than in 1887-88, notwithstanding the fact that markets, both local and foreign, were dull for many months.

The total expenditure of the year amounted to R11,80,722, or R1,48,028 more than in 1887-88. In Tenasserim the excess was R45,155. The expenditure in the Pegu Circle was R1,02,873 over that of 1887-88, and is in proportion to the revenue and necessities of the year. The net surplus in the Tenasserim Circle was R2,95,293 and in the Pegu Circle R11,33,290, compared with R2,14,429 and R9,71,774 in 1887-88.

In Upper Burma the actual surplus has considerably exceeded this estimate. The gross income proper of the year amounted to R12,02,680, the expenditure proper to R2,50,694, and the surplus proper to R9,51,986. To the receipts, however, there have had to be added, as a matter of account, R3,77,248, due by the Bombay Burma Trading Corporation as tonnage duty on the timber worked out by them in 1887-88, while to the charges there have had to be added, also as a matter of account, the sum of R4,34,435 allowed by Government to the Corporation in full of their claims against the *ex*-Burmese Government. Besides this sum Government has also made the Corporation an allowance of R1,00,000 as a set-off to the outlay incurred by them for police guards when the country was in a state of disturbance after the annexation. Even when allowance is made for that portion of the receipts of the past year which, as explained above, really belongs to 1887-88, there was a large and satisfactory increase due in great measure to the increase in the quantity of teak timber extracted and brought to

revenue stations. The greater part of the gross revenue was contributed by the holders of licenses for the working of the forests, especially by the Bombay Burma Trading Corporation.

When the current leases in Upper Burma fall in the total gross revenue of both Upper and Lower Burma forests will exceed 50 lakhs, or a little over half the present gross income derived from forests in all other Provinces of India. These figures are sufficient to indicate the serious financial importance of good Forest Administration in the Province.

Assam.—The financial results of the year's working, though as yet poor in themselves, are satisfactory as compared with those in past years. Compared with the previous years the receipts were in round numbers R36,500 more and the charges R17,000 less, or in all the surplus was R53,500 greater. The increased revenue and surplus are due to the greater quantity of timber and other produce removed from the forests by consumers and purchasers—chiefly to meet a growing demand for sál timber in the Goalpara Division—and it is hoped that every effort will be made to develop this trade and to secure the economical working of these forests up to their full productive powers.

Coorg.—The surplus revenue was nearly R2,000 greater than in the previous year, the receipts being more than R9,000 greater, while the charges were increased by R7,500. The results may be considered satisfactory.

Ajmere.—The total receipts of the year exhibit a decrease of R720; the expenditure also decreased by R3,222. As usual, practically, the whole of the receipts were derived from grazing, fodder, grass, and fuel.

The receipts do not include the estimated value of the produce, chiefly grass, granted free to the villagers, but the benefit of these grants to the population should be taken into account in considering the financial results of Forest Administration in Ajmere.

Baluchistan.—Owing to the reduced outturn, the reasons for which have already been given, the deficit exceeded that of the year before by R6,636.

Andamans.—The financial results of the year's working were satisfactory, the net surplus on the year's transactions being nearly R49,000, as compared with a little over R41,000 during the previous year. The receipts and charges are shown in detail in the statement already given.

It is stated that, including the value of the stock in depôt added during the year, the real net surplus on the year's working amounts to R92,647.

Berar.—The financial results of the year's working were slightly better than those of 1887-88, the charges being less by nearly R14,000 and the receipts more by R2,000. The surplus for the year was the highest on record, and the proportion of the surplus to gross receipts reached 59 per cent. This high percentage of net revenue is due to all produce sold being removed by purchasers. There is consequently no outlay on the removal of timber and produce from the forests by Government agency.

Bombay.—The gross receipts were the highest yet obtained in the Northern Circle, while those of the Southern and Sind Circles fall below those of the previous year by R1,61,096 and R2,16,435, respectively. The total result was a gross revenue less than that of the previous year by R1,85,385. Charges were reduced in both the Southern and Sind Circles, and these brought about a surplus in excess of that of the previous year by R61,012.

The financial results obtained in the Northern Circle are highly creditable. The sales of timber in the Southern Circle may be expected to increase and the revenue to improve; and now that arrangements have been come to with the North-Western Railway the normal quantity of firewood will again be saleable from the Sind forests.

The outlay on the formation, protection, and improvement of the forests is very much higher in proportion to the gross revenue in the Northern than in either of the other Circles.

In the Northern Circle the chief items of increase are timber (more than a lakh) and grazing fees. Only one division failed to balance receipts and expenditure, but even in that division a considerable improvement on the financial position of the previous year is discernible.

In the Southern Circle the only division worked at a loss is Ratnagiri, and it is satisfactory to observe that in that division appreciable progress has been made towards, at least, an equalization of receipts and expenditure.

In the Sind Circle there is a decrease in net revenue of R36,419. Receipts from firewood and charcoal exhibit a net decrease of R60,269, which is due to the North-Western Railway having had a large stock of fuel on hand at the commencement of the year, so that a smaller supply was indented for during the year.

Madras.—The financial results have improved proportionately with the increased outturn and are rightly described as very satisfactory. The surplus for the year under review amounted to R2,98,332, while the average surplus for the preceding six years was R2,16,441.

It is gathered that works of forest protection and improvement absorbed 53 per cent. of the gross revenue, when expenditure on departmental timber operations is treated as an advance recoverable and deducted from both sides of the account.

CHAPTER V.

GENERAL REMARKS.

I.—Forest Instruction.

53. One of the most important subjects with which it is necessary to deal in connection with the progress of Forest Administration in India is that of the training of the Staff. It is generally admitted that, while the present Staff is inadequate to the duties which it has to perform, it is impossible, for financial reasons, to increase to any great extent the Controlling Staff appointed from England. It will, therefore, be necessary in the near future to very largely increase the numbers of the subordinates of the superior service, and to entrust such officers with many of the duties at present performed by the Officers appointed by the Secretary of State. This change will necessitate not alone a higher professional training on the part of these latter officers, whose duties will become more and more important, but also the training of a large staff of subordinates of the superior service who will be called on to perform new and more responsible duties.

The officers appointed in England to fill the superior grades of the service are selected and trained at Cooper's Hill College. During the year under review ten candidates who had been so trained were appointed to the Department by the Secretary of State, and arrived in this country towards the close of the year, and twelve candidates were selected for training at the examination for entrance held in June 1888. The question of extending the course of instruction from the present term of 26 months to 3 years has also come under discussion. It is of the greatest importance that the officers appointed in England should receive the most complete professional training, so as to be fitted for the selected posts of control they will be required to fill in India.

Officers selected to fill appointments of the Ranger and Sub-Assistant classes in the Provinces under the Government of India and in the Madras Presidency are trained at the Forest School at Dehra Dun, which was established in 1882 for the purpose of affording such training. During the year under review 69 students attended the School. Of this number, 50 were in Government employ and deputed from different Provinces, 7 came from Native States, and 12 were private pupils. All candidates, unless they are graduates in Arts, Science, or Engineering, will in future be required to pass an entrance examination before admission. The Government of India consider the necessity for maintaining a test of this kind to be established by the fact that, out of 31 candidates, no less than 10 failed to pass a simple qualifying examination.

During the year under review, 25 students (besides three who entered the Foresters' class) joined the School and attended the first year's course as candidates for the Rangers' Certificate.

Rangers' Certificates were granted to 21 students during the year. Five of the recipients gained certificates in July 1888, after having failed to pass the ordinary examinations in the previous March. In future students who fail to pass the final examinations will be required to attend the School for another year before again presenting themselves for final examination. The examinations were conducted by the Officers of the School; but it is desirable that in future an independent Committee may be appointed to conduct the examinations.

The cost of the School, including the salaries and travelling and other allowances of the Teaching Staff, amounted during the year to R32,961. The total cost of the School since its establishment to the end of March 1889, including capital expenditure on School buildings, &c., has amounted to R2,15,835.

The insufficiency of the present School Staff is strongly commented on by the Officiating Director. This Staff consisted of a Director, a Deputy Director, and one permanent Instructor, assisted during a part of the year by the officers in charge of the Dehra Dun and the Saharanpur Divisions, the Superintendent of Forest Surveys and his assistants, and for short periods by special Officers deputed to lecture on botany and entomology.

With regard to this Staff the Officiating Director states that—

"Thirty men, divided into two separate classes, are already too many for a single teacher, seeing that he alone has to keep all the men fully employed during the entire working day of six hours. But during at least one month of the cold-weather term the Deputy Director has under his own unaided tuition the two remaining classes also, that is to say, all the students present at the School, aggregating about 60 men. Besides having to teach, singlehanded, this large body of men divided into four several classes. He has also to look after their discipline and the thousand and one little matters that constantly arise in the management of a large school on tour. So much work cannot obviously be efficiently performed by a single officer and even its continued inefficient performances under such circumstances depends on the mere accident of this one individual remaining in good health throughout the seven months of the camping season. Thus under the present organization of the School a complete breakdown of the entire teaching is always a likely occurrence, and we can only thank our rare good fortune that no breakdown has yet occurred. Such a state of things should obviously not be allowed to continue."

The officers appointed to the Ranger class in the Bombay Presidency do not attend the Dehra Dun School; but under the orders of the Bombay Government they are, to a certain extent, trained at the College of Science at Poona. Regarding this training the Conservator, Southern Circle, Bombay, reported as follows:—

"During the year under report eight students joined the Forest Class attached to the College of Science, Poona, and one passed the final examination in September 1888. The Working-Plans Officer gave a series of lectures in Forestry during the rains. It is much to be regretted that the Forestry lectures cannot be continuous throughout the several terms of the year, and the Conservator would submit that the time has arrived for special arrangement to be made whereby this advantage will be secured for the proprietors of estates. Inamdars as well as Native Chiefs are awakening to an appreciation of the value of forest conservancy and to the desirability of bringing their forest properties under scientific management, and it is becoming apparent more and more every day that the maintenance and augmentation of the general prosperity of this country is dependent in a very great measure upon a wide-spreading system of approved forest conservancy."

II.—Establishments.

54. The insufficiency of the present Staff, and the difficulty it experiences in dealing with the yearly increasing work with which it is charged, were again prominently brought to notice in most of the Provincial Reports for the year under review. It is generally admitted that the Staff is too weak to adequately manage the State Forest property, which it controls. The yield from the forests is, however, as yet so small that, for financial reasons, it is impossible to largely increase the European Staff. It is, however, hoped that before long it will be possible to obtain a largely increased staff of natives of the country trained in Forestry in India, to whom it will be possible to entrust many of the duties which have hitherto been more or less exclusively performed by Europeans. A scheme for the reorganization of the Controlling Staff of the

Forest Department is now under consideration, which, when supplemented by a considerable augmentation in the Executive Staff, will, it is hoped, remedy the defects to which reference has now been made.

The increased expenditure on establishments that this will involve is fully justified. Out of the total expenditure of R33,97,928 incurred during the year on establishments, it appears from the accounts that R19,64,925 represent the salaries of officers while employed in connection with timber works, or the realization of the produce from the forests; so that the balance, or R14,33,003, is alone, properly speaking, debitable to the maintenance and improvement of the forests. In other words, of the R27,80,920, or 31 per cent. of the "profits" of R88,55,377 realized during the year, which it has been shown in the statement given in para. 51 was invested in the forests, only R14,33,003, or 16 per cent., were expended on "establishments," and R13,47,917, or 15 per cent., on "works" of improvement.

Such percentage as this is too small for the efficient working and development of forests on European principles, for, as has already been explained, the outlay in European countries is on an average not less than 50 per cent. of the "profits" and about one-half of this outlay, or 25 per cent., goes to meet establishment charges.

It may be assumed that in India, where Europeans, who at present alone possess the professional skill and administrative ability required by Forest Officers of the Controlling Staff, necessarily cost more than in Europe, an efficient Forest Staff will absorb more than 25 per cent. of the profits. Were, however, such a proportion of the revenue devoted to the entertainment of establishments, the expenditure during the past year under this heading, debited to the improvement and maintenance of the forests, would have amounted to something like twenty-six lakhs, instead of the fourteen and a half lakhs really expended.

55. *Bengal.*—Owing to the depletion of the Executive Staff, it was found impossible to depute any of its members to the Dehra Dun Forest School during the year under report. It is stated that the difficulties mentioned in previous Reports in obtaining recruits in Bengal for the class of Forester continue to be experienced, and are, as usual, attributed to the preference evinced for sedentary employment.

The Conservator records a remarkable increase in the number of serious offences laid to the charge of members of the lower grades of the Department, and it would seem advisable to consider whether additional inducements, in the shape of improved pay or prospects, are required in order to attract suitable candidates in sufficient numbers, or whether the general improvement of the position of upper subordinates under the reorganization scheme will not, if sanctioned, make forest service more popular even in the lowest grades.

Since the financial prospects of Forest Administration in Bengal will not admit of the development of the Controlling Staff by the appointment of a greater number of Europeans, the management of the forests must be largely entrusted to Sub-Assistants and Rangers.

North-Western Provinces and Oudh.—The Conservator of the Central Circle urges the necessity for revising the Upper Subordinate Establishment of Sub-Assistant Conservators and Rangers. The 22 ranges in the Circle have been in charge of four Rangers and 18 Foresters. In the Oudh Circle the reorganization of the Subordinate Staff was sanctioned by the Government of India after the close of the year, but this Conservator is also of opinion that the forests cannot be fully worked without a strengthening of the Superior Staff. In the School Circle the seven Rangers are said to have done excellent work. The Foresters, some of whom are in charge of ranges, are well reported on. The Forest Guards generally did well. One Forester obtained the Forester's Certificate.

Punjab.—The Conservator states that out of a nominal list of 19 Executive Gazetted Officers in the Punjab, there were only 12 officers present. This necessitated the placing in abeyance of the Working-Plans Branch and the putting of a Sub-Assistant Conservator in charge of a Division, and much disappointment to officers anxious to take privilege leave.

His Honour the Lieutenant-Governor remarks that he is aware that other Provinces have also suffered from under-recruitment, and that the Government of India has experienced much difficulty in meeting the frequent demands made for officers, but hopes that it will be possible to take early steps to remedy the present dearth of officers in the Punjab.

Central Provinces.—The insufficiency of the Controlling Staff is strongly commented on by the Local Government; but the Government of India suggest that for the economical management of forests, like the majority of those in the Central Provinces, it may be necessary in the future to entrust Natives of the country with many of the duties that have hitherto been performed more or less exclusively by Europeans.

Burma.—In Lower Burma it is reported that, although the Controlling Staff was strengthened in January 1889 by the addition of two newly trained officers from England, it is still below the actual requirements. No Gazetted Officer was available for the West Salween Division, which remained throughout the year in charge of a Forest Ranger under the general supervision of the Conservator.

From Upper Burma it is stated that both the upper and lower grades of the service are at present insufficiently manned. The strength of the Controlling Staff is still below that sanctioned by the Government of India, while it has already been found necessary to supplement the Subordinate Establishment by the employment of temporary men.

Assam.—The Protective Establishment had to be increased by the addition of subordinates for the present on the temporary scale. Nothing is recorded as to the sufficiency or otherwise of the Superior Staff.

Coorg.—The Forest Officer reports that some increase in the Permanent Staff is much needed, and states that the increase in the Revenue warrants this.

Ajmere.—Nothing of importance is recorded.

Baluchistan.—Nothing is recorded on the subject of establishments.

Andamans.—No Subordinate Protective Staff is employed, and nothing of importance is recorded.

Berar.—The Conservator reports that there are no officers above the rank of Ranger available for special works. There is not an officer available for the charge of every District, nor is there any reserve of officers whatever for occasions of leave or sickness. One of the officers has served six years since his last privilege leave, one over four years, another over three years. In the event of the severe illness of one or two superior officers, work would, it is feared, greatly suffer. Fortunately the Divisional Officers have kept fairly well hitherto, in spite of a feverish and hot climate, and, as regards the Melghât, a more than usually unhealthy one.

Bombay.—The Conservator of the Northern Circle complains of the numerical insufficiency of Forest Guards and of the higher class of Subordinate Officers, and adds that propositions for the complete reorganization of the Subordinate Staff have been submitted.

Madras.—The Conservator of the Northern Circle remarks that the weakness of the Staff of the Circle is so marked that it is difficult to see how proper progress is to be expected unless matters alter and a Staff fit to do the work is obtained. Six officers for nearly 20,000 square miles of forest of all kinds and over 7,000 square miles of Reserved forests (present or under settlement) is obviously utterly inadequate, especially when it is considered that there are forest divisions in Northern India in which 100 square miles is not considered too small an area for one officer. If the full complement of ten District Forest Officers were all present, each would have on an average 730 square miles of Reserved and 1,249 square miles of Unreserved Forest to look after. In some districts, the want of good officers, capable of taking their full responsibility, has resulted in the state of affairs becoming bad, and especially is this the case in Anantapur. If recruits cannot be obtained from the Government of India, as has been urgently asked for, it is to be feared that not only will progress be very slight, but works already done will suffer and the revenue be seriously affected.

The Conservator, Southern Circle, states that Dr. Brandis in his "Suggestions" written in 1882, foresaw and urged the necessity for a revised and increased scale being prepared after three years' experience. Six years have since elapsed. Eight thousand and ninety-eight square miles of Reserves are in hand. And the revenue has risen from 5½ to 9 lakhs. Under these circumstances, a considerable increase to the Permanent Staff seems justified, and demands are urgent from almost all districts.

III.—Experimental cultivation of Exotic and other Trees.

56. This subject calls for no special remarks. The Forest Department is gradually being less and less used as an agency for experimenting in the cultivation of new species or of exotic trees, as it is found that such experiments can be much more economically and efficiently carried out in Botanical Gardens.

57. *Bengal.*—Some experiments were carried out with regard to the propagation of *Mahogany*, but would not appear to have been successful.

North-Western Provinces and Oudh.—There is nothing to record with regard to experiments with exotic trees.

Punjab.—The few experiments with exotic trees were rarely successful, except those with regard to cultivation of the Spanish Chestnut which were attended with good results. The services of officers of the Forest Department are being utilized in extending the cultivation of fruit trees wherever practicable.

Central Provinces.—There is nothing to record under this heading.

Burma.—In Lower Burma there was nothing of any particular interest to record. In Upper Burma some promising experiments were made in introducing fruit trees of European kinds, and the growth of the 300 young trees at Bernardmyo will be watched with interest. The experiments with Himalayan species indicate that conifers are likely to succeed at the elevation of Bernardmyo, and they will be useful for ornamental purposes if a permanent hill station should be established there.

Assam.—The experimental timber plantations in the Nambor Forest had seven acres of Poma (*Cedrela Toona*) added to them at a cost of R10 per acre. A nursery for raising seedlings of Mukai (*Shorea Assamica*) was prepared in the Makum Forest for the purpose of adding by planting to the natural regeneration, but the results are up to date not satisfactory. Two maunds of oak-seed were collected and sown at a total cost of R8.

The Cinchona plants are not doing well at Tura; the locality is not suited, and the altitude not high enough for them. Two attempts were made to sow sál in the Dambu Reserve.

Coorg.—Nothing of interest is recorded. No new exotics were introduced. A few date-seeds were obtained and sown, and some plants survive, but have not made much growth. The *Frenela Rhomboidea* and *Cupressus Torulosa* plants that survive in the fuel plantations look healthy and promise to do well.

Ajmere.—Seeds of indigenous trees and of bamboo were sown broadcast and in notches in various tracts. Out of the date offsets received from Bussrah in 1886-87, only 16 are said to be alive. It is, therefore, considered desirable to repeat the experiment, and 100 more offsets have been asked for which, if carefully tended, ought to meet with a better fate than the last batch did.

Baluchistan.—The experiments already commenced with regard to the cultivation of *eucalyptus*, chestnut, plane tree, oaks, *chil* pine, &c., were continued with a considerable amount of success.

Andamans.—No experiments were made.

Berar.—The experiments with regard to date cultivation were continued. The two date plantations at Ellichpur are reported to contain some 700 plants. Many died off but were replaced. R101 were expended in this connection.

Some Malta lemon plants planted out in 1886 are doing well.

Bombay.—There is nothing of any importance recorded with regard to experiments with exotics, and it is stated that but little importance is attached to such experiments in connection with Forestry.

Madras.—Most favourable results have been obtained with the date-palm. The sowing of the seed of bazaar fruits was successful. It has been conclusively proved that the *eucalyptus* cannot be grown in the plains except perhaps at an expenditure which is prohibitive. The mahogany did well in Chingleput and North and South Arcot and at the foot of the Nilgiris, but in the Wynaad the results were disappointing. The experiments with giant bamboos were most encouraging.

Experiments in the cultivation of such trees as the date-palm, it is believed, are usually carried on by Forest Officers, as they often have special facilities for conducting them, without serious interference with their other duties.

IV.—Forest Tramways.

58. Conservators of Forests were requested by the Inspector General, in a demi-official Circular, to give in their Annual Reports a concise account of what has been done, or what it is contemplated doing in the immediate future, as regards the employment, for the extraction of forest produce, of portable tramways, which in time of need might be utilized for famine relief or other works. From what has been recorded it would appear that it is not at present profitable in the majority of cases to employ

tramways for forest works. It is, however, possible that their use will become more general as forests improve under fire-protection and systematic management and exploitations become more concentrated.

The following is a summary of the remarks recorded in response to the Inspector General's enquiry.

59. *Bengal.*—No remarks are recorded.

North-Western Provinces and Oudh.—The Conservator's Reports are unfavourable. The only lines they mention as commercially practicable are from Kotdwara to Najibabad in the Bijnor District, from Mailani to Duduaghat in Kheri, and from Nishangara to the Sarda in Bahraich. The construction of the second of these lines is, it is stated, in consideration with the Agent of the Bengal and North-West Railway.

Punjab.—The Conservator states that the only portable tramway in the Province is the one at Changa Manga, which continues to do good work in the removal of fuel.

Central Provinces.—No remarks are recorded.

Burma.—The Conservator, Tenasserim Circle, remarks that nothing whatever has been undertaken in the direction of introducing tramways in Burma, and in view of the excellent water communication that exists throughout the Circle, and the scattered manner in which valuable trees occur, it is not likely that their introduction will be at any time advantageous for forest work. The Conservators of the other Circles do not mention the subject.

Assam.—The Conservator states that portable tramways for the extraction of forest produce have not as yet been introduced into Assam; and it is very doubtful that they could be profitably employed, because there are, on the one hand, excellent waterways for the transport of timber all through the Province, and, on the other hand, mature trees are greatly scattered over large extents of country.

Coorg.—No remarks are recorded.

Ajmere.—The Assistant Conservator remarks that nothing has been done or is likely to be done in the immediate future for the introduction of portable tramways. The Chief Commissioner concurs in this view. The country is so hilly that the cost of construction of any tramway would be very great; moreover, the sale of forest produce is not sufficiently extensive to necessitate the use of any conveyance other than the village carts, which are cheap and always available.

Baluchistan.—The Deputy Conservator remarks that at present it is not contemplated to introduce portable tramways for the extraction of forest produce in Baluchistan. The only place where they would be useful is on the Mangi-Ziarat road for the extraction of Juniper wood from the forests there, but not less than 12 to 14 miles of tramways would be necessary, and the cost would be prohibitive.

Andamans.—The Deputy Conservator remarks that no portable tramways have as yet been tried in the Andamans, but the question is under consideration with a view to reducing the present cost of dragging and to save the elephants now overworked.

Berar.—The Conservator reports that, while nothing has been done hitherto, circumstances make it improbable that anything will be done hereafter, or at least for a very long time to come, towards adopting this means of exporting forest produce from the Berar Forests. None of the State Forests in South Berar contain, as yet, anything to export; and the forests of the Melghât cover a difficult country in which suitable lines of tramway would, it is thought, be impracticable, apart from which fact the apparent resources of the Melghât are too limited and too inferior in value to justify the supposition that a tramway would be just now, or even in the near future, anything but a ruinous undertaking.

Bombay.—The Conservator, Northern Circle, remarks that, although the introduction of portable tramways and other agencies, such as artificial water-carriage, for the conveyance of timber from forests in rough and inaccessible parts of the country to markets has been under consideration, he apprehends that the time has not yet arrived when expenditure upon tramway and water-carriage can be recommended with the certainty of financial advantage in the immediate future; the Working-Plans Division has not yet made sufficient advance, and forest organization and constitution are still very backward, and the forests are also still young. It is, however, possible that a tramway might serve in the forests of a part of the Dahanu Range, and of the Talasri Mahal, and it is probable that a tramway might be of great use in the Dangs to bring timber, &c., to the coast markets, and the improvement of the existing water-carriage, and the excavation of a canal, where the water porterage is now defective, might open out the Syhadri Forests to the Southern Maratha Railway, for the supply of fuel.

No mention is made of the subject by the Conservators of other Circles.

Madras.—The Conservator, Southern Circle, says nothing about what it may be possible to do in the future as regards extending the use of tramways, but reports very favourably with regard to the tramway lines already in existence.

The Conservator, Northern Circle, states that he is anxious to utilize still more the great facilities which these lines give for economy in transport. A few small lengths in the Nilgiri Working Circles would be very valuable, and in Ganjam, Godavari, and Kurnool the use of portable tramway lines would do very much to improve the extraction of material, the difficulty of which is now in the cost of labour and trouble of procuring carriage. But at present, with other works to distract the District Forest Officer's attention, money might be wasted if tramways were set up, without very full previous consideration. But the Conservator has indicated a few places where tramways may be useful, and he would add that in his opinion it would be a great thing if one could be made from Gopalpore to Aska and Russellkonda in Ganjam. It would probably pay financially and would be invaluable to the Department. He suggests this as a famine work or a work for the Local Board.

The Government of India have pointed out with regard to these remarks that, before definite conclusions can be drawn as to the financial success of the Forest tramways in Nellore, North Arcot, and South Coimbatore, they must be more fully reported upon, and the results compared with the cost of carriage by cart. In such calculations the rates per units of weight and distance, and the estimated cost of transport by tramway, not only maintenance and working charges, but also interest on the capital invested, and a reasonable proportion of the original outlay (probably not less than 10 per cent.) to allow for yearly deterioration, should be included. So far the actual saving in the cost of transport by tramways, as compared with cost by cart, would appear to be very small.

V.—Exports of Forest Produce.

60. *Statement showing the exports of Forest Produce from India to Foreign Countries in 1888-89.*

Articles.	Quantity in tons of 20 cwt. in the case of Teak, 50 cubic feet.		Valuation at port of shipment in 1888-89.	
	Average of five years, 1883-84 to 1887-88.	In 1888-89.	Total.	Per ton.
			R	R
Caoutchouc	...	434	9,67,348	2,229
Shell-lac	...	4,069	31,94,125	785
Lac-dye	...	17	8,038	473
Cardamoms	...	168	4,00,333	2,383
Sandalwood, ebony, and other ornamental woods.	Quantity not available		5,09,328	...
Cutch and Gambier	...	14,545	44,23,258	304
Myrabolams	...	31,403	24,93,368	79
Teak	...	52,609	57,52,634	109
Total in 1888-89	...	...	1,77,48,432	...
Total in 1887-88	...	...	1,67,38,371	...
Increase in 1888-89	...	...	10,10,061	...

APPENDICES.

BENGAL SECRETARIAT LIBRARY.

APPEN
STATE

Summary of the Revenue and Expenditure of the Forest

Budget Heads.	Bengal Presidency (British Territories).										
	Imperial.	Bengal.	North-Western Provinces and Oudh.	Punjab.	Central Provinces.	Lower Burma.	Upper Burma.	Assam.	Coorg.	Ajmere.	Baluchistan.
REVENUE.	R	R	R	R	R	R	R	R	R	R	R
I.—Timber and other produce removed from the forests by Government agency.	...	56,773	6,10,743	6,16,682	1,60,374	19,87,990	80,703	6,695	82,978	996	1,515
II.—Timber and other produce removed from the forests by consumers or purchasers.	4,017	5,96,707	8,03,079	3,92,414	9,86,469	4,09,096	14,72,215	2,58,022	37,271	11,389	3,944
III.—Drift and waif wood and confiscated forest produce.	...	7,261	19,389	12,684	4,647	1,34,537	8,520	2,716	...	...	...
IV.—Revenue from forests not managed by Government.	...	...	13,795	1,613	11,553	41,252	...	10,325	...	...	...
V.—Miscellaneous . .	...	16,166	15,796	22,375	17,362	36,430	18,490	26,124	15,934	1,189	209
Total Revenue .	4,017	6,76,907	14,62,802	10,45,768	11,80,405	26,09,305	15,79,928	3,03,882	1,36,183	13,574	5,668
EXPENDITURE.											
A.—Conservancy and Works.											
I.—Timber and other produce removed from the forests by Government agency.	...	40,701	2,68,514	1,99,863	76,296	6,93,605	5,732	1,171	33,883	549	378
II.—Timber and other produce removed from the forests by consumers or purchasers	...	37,518	40,179	2,179	90,898	7,593	3,868	9,654	676	5	...
III.—Drift and waif wood and confiscated forest produce.	...	3,455	8,305	4,008	...	60,122	5,771	135	...	...	...
IV.—Revenue from forests not managed by Government.	...	...	3,417	...	...	6,378	...	...	...	...	...
V.—Rent of leased forests, and payments to shareholders in forests managed by Government.	...	...	11,760	38,213	252	...	...	...	...	...	...
VI.—Live-stock, stores, tools and plant.	...	14,466	21,438	4,273	11,138	24,821	48,364	10,183	1,461	181	20
VII.—Communications and buildings.	...	24,075	1,02,588	12,580	3,865	15,212	26,894	14,571	2,133	354	157
VIII.—Demarcation, improvement, and extension of forests.	...	42,701	77,815	42,867	1,23,842	1,29,268	6,672	32,361	15,099	1,722	1,210
IX.—Miscellaneous . .	...	3,440	9,753	958	3,607	11,297	5,36,609	4,622	172	121	...
Total Conservancy and Works.	...	1,66,356	5,43,769	3,04,941	3,09,898	9,48,296	6,33,910	72,697	53,424	2,932	1,765
B.—Establishments.											
I.—Salaries . . .	41,166	1,72,776	2,51,653	2,37,168	3,21,477	2,41,171	1,27,707	1,11,775	22,474	10,734	10,871
II.—Travelling allowances .	7,764	28,986	33,281	33,849	19,753	33,656	20,243	19,980	3,601	1,431	2,965
III.—Contingencies . .	2,219	8,152	15,841	17,927	17,568	8,821	3,269	5,453	676	579	393
Total Establishments .	51,149	2,09,914	3,00,775	2,88,944	3,58,799	2,83,648	1,51,219	1,37,208	26,751	12,744	14,229
Charges in England .	23,920	...	...	...	...	...	...	...	...	...	...
Exchange on England .	11,130	...	...	...	...	...	...	...	...	...	...
Grand Total of Expenditure.	86,199	3,76,270	8,44,544	5,93,885	6,68,697	12,31,944	7,85,129	2,09,905	80,175	15,676	15,994
Surplus .	...	3,00,637	6,18,258	4,51,883	5,11,708	13,77,361	7,94,799	93,977	56,008	...	...
Deficit .	82,182	...	...	...	...	...	...	...	...	2,102	10,326

DICES.

MENT I.

Department in India for the year 1888-89.

Andamans.	Forest School.	Forest Surveys (Imperial).	Total Bengal Presidency (British Territories).	Madras.	Bombay.	Total British Provinces.	Berar.	Forest Surveys (Berar).	Grand Total.	Budget Heads.
R	R	R	R	R	R	R	R	R	R	REVENUE.
1,04,738	...	...	37,10,182	3,48,540	13,87,133	54,45,855	...	...	54,45,855	I.—Timber and other produce removed from the forests by Government agency.
1,277	...	...	49,75,900	11,25,621	13,65,285	74,66,806	4,04,894	...	78,71,700	II.—Timber and other produce removed from the forests by consumers or purchasers.
...	...	...	1,89,754	16,263	6,508	2,12,525	1,132	...	2,13,657	III.—Drift and waif wood and confiscated forest produce.
...	...	...	78,538	19	35,630	1,14,187	...	...	1,14,187	IV.—Revenue from forests not managed by Government.
65	449	315	1,70,904	24,563	55,634	2,51,101	1,951	...	2,53,052	V.—Miscellaneous.
1,06,075	449	315	91,25,278	15,15,006	28,50,190	1,34,90,474	4,07,977	...	1,38,98,451	Total Revenue.
										EXPENDITURE.
										A.—Conservancy and Works.
32,326	...	...	13,53,018	1,75,086	5,55,332	20,83,436	...	...	20,83,436	I.—Timber and other produce removed from the forests by Government agency.
...	...	...	1,92,570	75,180	30,881	2,98,631	21,364	...	3,19,995	II.—Timber and other produce removed from the forests by consumers or purchasers.
...	...	...	81,796	3,560	170	85,526	...	...	85,526	III.—Drift and waif wood and confiscated forest produce.
...	...	...	9,795	...	5,182	14,977	...	...	14,977	IV.—Revenue from forests not managed by Government.
...	...	...	50,225	16,899	28,470	95,594	17,120	...	1,12,714	V.—Rent of leased forests and payments to shareholders in forests managed by Government.
14,504	452	1,086	1,52,387	1,06,956	2,958	2,62,301	5,069	2,357	2,69,727	VI.—Live-stock, stores, tools and plant.
...	...	...	2,02,429	59,841	11,317	2,73,587	19,930	...	2,93,517	VII.—Communications and buildings.
336	...	1,886	4,75,779	2,20,323	2,11,119	9,07,221	10,392	3,090	9,20,703	VIII.—Demarcation, improvement, and extension of forests.
13	2,564	1,459	5,74,615	8,842	9,584	5,93,041	1,750	1,397	5,96,188	IX.—Miscellaneous.
47,179	3,016	4,431	30,92,614	6,66,687	8,55,013	46,14,314	75,625	6,844	46,96,783	Total Conservancy and Works.
										B.—Establishments.
8,182	26,720	13,328	15,97,202	4,26,563	6,92,190	27,15,955	76,017	13,072	28,05,044	I.—Salaries.
1,905	1,687	2,814	2,11,915	1,02,041	1,02,497	4,16,453	13,201	3,284	4,32,938	II.—Travelling allowances.
29	1,538	1,591	84,057	25,503	44,262	1,53,822	5,369	755	1,59,946	III.—Contingencies.
10,116	29,945	17,733	18,93,174	5,54,107	8,38,949	32,86,230	94,587	17,111	33,97,928	Total Establishments.
...	...	...	23,920	...	...	23,920	...	...	23,920	Charges in England.
...	...	...	11,130	...	...	11,130	...	...	11,130	Exchange on England.
57,295	32,961	22,164	50,20,838	12,20,794	16,93,962	79,35,594	1,70,212	23,955	81,29,761	Grand Total of Expenditure.
48,780	...	...	42,53,411	2,94,212	11,56,228	55,54,880	2,37,765	...	57,68,690	Surplus.
...	32,512	21,849	1,48,971	...	...	...	...	23,955	...	Deficit.

STATEMENT II.*

Financial Results of Forest Administration in India for the year 1888-89.

Province.	Timber and other produce removed from the Forest by Government Agency.			Other Revenue.			Formation, Protection, and Improvement of Forests.	Total.		
	Receipts.	Charges.	Surplus or Deficit.	Receipts.	Charges.	Surplus or Deficit.	Charges.	Receipts.	Charges.	Surplus or Deficit.
	R	R	R	R	R	R	R	R	R	R
Bengal . .	63,498	56,162	7,336	6,13,409	1,45,065	4,68,344	1,66,942	6,76,907	3,68,169	3,08,738
North-Western Provinces and Oudh.	6,22,150	3,30,888	2,91,262	8,40,652	2,18,520	6,22,132	2,89,341	14,62,802	8,38,749	6,24,053
Punjab . .	6,29,367	3,40,534	2,88,833	4,16,401	1,00,520	3,15,881	1,51,868	10,45,768	5,92,922	4,52,846
Central Provinces .	1,60,374	98,508	61,866	10,20,031	2,73,070	7,46,961	2,28,021	11,80,405	5,99,599	5,80,806
Burma (Lower) .	20,42,696	8,48,544	11,94,152	5,66,609	1,63,029	4,03,580	1,69,149	26,09,305	11,80,722	14,28,583
Burma (Upper) .	80,703	5,732	74,971	14,99,225	6,55,630	8,43,595	1,23,767	15,79,928	7,85,129	7,94,799
Assam . .	9,411	1,305	8,106	2,94,471	85,427	2,09,044	1,23,173	3,03,882	2,09,905	93,977
Coorg . . .	82,978	44,574	38,404	53,205	5,573	47,632	30,028	1,36,183	80,175	56,008
Ajmere . .	996	549	447	12,577	5,098	8,479	10,029	13,573	15,676	—2,103
Baluchistan .	1,515	522	993	4,153	7,043	—2,890	8,429	5,668	15,994	—10,326
Andamans . .	1,04,733	56,959	47,774	1,342	...	1,342	336	1,06,075	57,295	48,780
Total .	37,98,421	17,84,277	20,14,144	53,22,075	16,58,975	36,63,100	13,01,083	91,20,496	47,44,335	43,76,161
Berar . .	...	..	...	4,08,192	1,15,038	2,93,154	54,257	4,08,192	1,69,295	2,38,897
Total Bengal Presidency.	37,98,421	17,84,277	20,14,144	57,30,267	17,74,013	39,56,254	13,55,340	95,28,688	49,13,630	46,15,058
Madras . .	3,48,540	3,32,251	16,289	11,66,466	2,55,769	9,10,697	6,28,654	15,15,006	12,16,674	2,98,332
Bombay . .	13,87,688	7,19,901	6,67,787	14,62,502	1,72,296	12,90,206	7,96,926	28,50,190	16,89,123	11,61,067
Grand Total .	55,34,649	28,36,429	26,98,220	73,60,284	83,59,235	61,57,157	27,80,920	1,88,93,884	78,19,427	60,74,457

* The figures in this statement are taken from Form No. 62 appended to the Annual Forest Reports (Form No. 67, Madras Report).

STATEMENT III.*

Revenue, Expenditure, and Surplus of the Forest Department throughout India during the 25 years from 1864-65 to 1888-89.

REVENUE.

Provinces.	1864-65.	1865-66.	1866-67.	1867-68.	1868-69.	1869-70.	1870-71.	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	1888-89.
	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Imperial†. .	421	30,959	752	543	1,159	1,436	3,107	2,334	2,771	1,225	1,144	1,465	2,490	1,36,772	16,716	17,214	18,887	27,407	30,732	32,907	26,574	14,708	4,186	4,817	4,017
Bengal . .	19,760	38,658	45,590	56,039	70,715	2,41,657	1,03,249	1,44,719	1,49,852	1,79,366	1,85,932	1,98,274	2,22,401	4,26,228	4,16,027	4,49,524	5,61,340	6,33,734	6,93,959	6,94,334	5,71,152	5,97,432	6,53,634	6,57,794	6,76,907
North-Western Provinces and Oudh . .	7,23,440	7,31,382	7,79,201	5,84,503	7,85,210	8,32,945	4,24,257	11,70,900	19,39,115	19,32,677	13,63,358	12,64,356	11,50,671	12,03,108	11,26,755	10,39,966	9,42,228	10,66,094	10,13,403	16,11,383	15,72,319	14,61,495	15,73,556	12,47,454	14,62,802
Punjab . .	5,27,081	3,50,680	3,96,050	2,80,510	3,44,882	3,94,129	9,47,236	7,10,216	6,52,995	7,32,539	8,34,874	9,09,831	5,98,754	6,83,711	5,00,619	6,49,819	6,71,678	6,88,308	7,66,709	9,10,177	7,49,352	8,50,419	11,27,277	7,86,936	10,45,768
Central Provinces . .	68,760	1,34,042	2,37,472	3,49,490	3,50,536	4,16,020	6,58,120	5,57,128	4,81,673	5,63,367	6,60,938	7,26,176	6,61,326	6,83,910	8,52,862	10,06,724	8,50,139	11,72,884	9,77,647	9,94,769	10,27,202	10,36,894	9,57,410	10,93,369	11,80,405
Burma (Lower)	9,34,070	8,98,485	4,24,774	6,46,812	8,17,599	9,84,774	8,18,124	7,72,400	8,27,569	10,68,621	10,74,802	17,79,020	15,51,408	16,03,082	11,37,562	11,80,190	15,16,613	22,31,804	25,03,896	25,09,275	16,70,982	20,23,859	19,98,667	22,18,897	26,09,305
" (Upper)	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	..	...	1,08,074	2,96,876	15,79,928
Assam . .	...	...	...	...	...	...	...	...	...	...	65,949	61,870	81,568	1,34,326	1,61,779	1,64,335	1,68,997	1,66,054	2,48,605	2,11,445	1,80,414	1,96,656	2,12,011	2,67,312	3,03,882
Coorg . .	57,488	1,01,157	32,508	79,082	98,496	1,08,135	72,144	92,466	84,425	1,10,284	58,015	1,07,460	75,927	1,01,015	52,020	1,01,786	87,857	1,00,364	1,38,022	87,822	1,13,233	89,386	99,291	1,27,028	1,36,183
Ajmere . .	...	...	...	...	...	...	...	...	24	304	202	410	905	3,002	1,241	1,861	1,124	4,065	7,125	8,198	10,456	9,697	11,274	14,293	13,574
Forest Surveys (Imperial) .	...	...	..	...	...	...	...	...	...	...	...	21	...	...	63	38	272	...	348	36	234	202	241	40	315
Forest School .	...	...	..	...	..	...	...	...	...	...	...	...	...	...	.	..	...	...	...	...	73	273	415	777	449
Andamans .	2,808	2,515	3,495	6,070	5,071	3,036	7,373	5,880	6,862	4,184	5,516	5,363	4,679	1,301	5,564	2,437	27,734	48,407	70,858	24,762	22,213	23,944	31,870	1,04,062	1,06,075
Total .	23,33,828	22,87,878	19,19,842	20,03,049	24,73,668	29,85,132	30,33,610	34,56,043	41,45,286	45,97,567	42,50,730	50,54,246	43,50,129	49,76,455	42,71,208	46,13,891	48,46,869	61,39,121	64,51,305	70,85,108	59,44,204	63,04,965	67,77,906	68,19,685	91,19,619
Madras . .	4,49,770	4,76,674	4,48,110	5,81,342	5,29,185	6,97,699	5,33,412	5,76,261	5,95,168	6,13,653	5,14,401	6,77,873	5,92,573	5,50,310	6,06,788	6,26,168	7,36,880	8,06,908	9,06,442	9,53,704	11,66,916	11,98,650	12,46,911	13,74,920	15,15,006
Bombay . .	10,81,907	13,07,611	8,21,268	8,84,244	12,13,483	12,35,257	11,68,401	11,50,215	11,46,405	11,88,089	12,24,051	12,48,672	12,26,658	12,61,528	11,81,894	15,24,712	15,22,807	18,28,117	20,90,353	25,03,100	27,74,842	33,66,286	30,32,676	30,32,577	28,50,190
Total (British India) .	38,65,505	37,72,163	31,89,220	34,68,635	42,16,336	49,18,088	47,35,423	51,82,519	58,86,879	63,99,309	59,89,182	69,80,791	61,69,360	67 88,293	60,59,890	62,64,774	71,06,556	87,74,146	94,48,100	1,05,41,912	98,85,962	1,08,69,901	1,10,57,193	1,12,27,182	1,34,84,806
Berar . .	2,368	15,106	43,574	53,440	84,557	1,80,397	1,77,329	1,55,543	2,56,563	2,63,256	2,60,674	2,32,782	2,53,072	2,79,236	2,88,704	3,07,500	2,66,556	2,33,511	2,92,014	3,08,218	2,97,185	3,19,851	3,26,261	4,06,447	4,07,977
Forest Surveys Berar) .	...	...	...	...	.	...	...	...	...	...	...	...	...	...	.			...	...	...	934	631	651	596	...
Baluchistan .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.	14,376	18,616	5,039	4,752	6,089	14,962	14,081	14,063	5,668
Grand Total .	38,67,873	37,87,269	32,32,794	35,22,075	43,00,893	50,98,485	49,12,752	53,38,062	61,43,442	66,62,565	62,49,856	72,13,573	64,22,432	70,67,529	63,48,594	70,72,274	73,87,488	90,26,273	97,45,153	1,08,54,882	1,01,90,170	1,12,05,345	1,13,98,486	1,16,48,288	1,38,98,451

* The figures in this statement have been revised by the Comptroller and Auditor General.
† Includes certain Home receipts and undistributable and petty coal items.

STATEMENT III.—*continued.*

EXPENDITURE.

Provinces.	1864-65.	1865-66.	1866-67.	1867-68.	1868-69.	1869-70.	1870-71.	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	1888-89.
	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Imperial*	44,297	16,981	32,078	38,924	33,007	54,108	51,423	66,530	67,150	79,216	81,210	48,239	44,004	98,099	63,956	73,810	65,291	77,635	87,268	93,297	96,306	88,245	86,299	78,628	86,199
Bengal	3,971	45,292	1,05,215	1,67,495	1,15,933	1,17,899	86,479	1,10,989	1,00,777	1,39,274	1,01,361	1,42,676	2,14,497	2,62,913	3,38,675	2,75,748	3,35,381	3,94,612	3,82,183	3,87,813	4,11,915	3,70,399	4,22,781	3,90,368	3,76,270
North-Western Provinces and Oudh	5,03,580	3,31,261	4,10,205	3,89,806	5,01,021	5,29,422	8,10,073	11,10,071	11,74,656	11,90,794	10,61,302	7,36,979	8,61,362	7,28,926	8,09,977	7,16,594	6,79,574	9,16,212	8,39,025	10,41,885	10,20,101	9,74,519	9,19,580	8,30,748	8,44,544
Punjab	5,78,616	2,71,369	2,63,373	2,88,029	3,17,634	7,41,432	11,95,655	7,07,619	8,90,369	6,11,556	6,58,983	5,56,911	5,25,659	5,20,631	5,23,554	4,80,676	4,95,368	5,16,269	5,60,750	6,53,146	5,58,070	6,75,483	7,16,519	6,77,912	5,93,885
Central Provinces	1,55,270	1,08,597	1,49,408	2,18,434	3,19,126	4,74,930	3,17,928	2,31,633	2,50,578	2,85,939	2,94,449	3,73,327	2,90,295	3,22,034	3,93,758	5,22,574	4,95,512	4,97,013	4,12,247	4,36,058	4,95,821	4,45,432	4,99,293	5,52,939	6,68,697
Burma (Lower)	2,62,930	3,11,941	2,86,993	3,30,526	4,24,333	4,22,106	4,00,851	3,79,217	3,36,759	4,75,304	6,63,547	8,15,659	10,05,554	8,58,231	7,18,102	7,53,490	7,12,568	11,50,224	12,28,955	12,17,824	12,12,233	11,50,952	10,75,830	10,32,694	12,31,944
,, (Upper)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2,188	1,21,125	7,85,129
Assam	...	...	...	...	...	...	...	...	...	...	60,367	63,397	90,520	1,01,153	1,26,028	1,32,829	1,42,725	1,65,361	1,71,823	1,99,562	1,97,699	2,11,494	2,12,287	2,26,892	2,09,985
Coorg	3,407	12,996	8,650	13,722	17,848	33,064	24,747	70,178	29,478	45,952	37,999	40,168	33,692	36,268	34,829	55,165	56,487	59,796	64,770	75,023	76,951	65,690	74,088	72,629	80,175
Ajmere	...	...	...	...	...	...	...	...	13,054	17,932	15,281	27,346	22,460	14,926	13,445	13,750	12,423	13,954	11,284	14,574	16,316	16,469	20,744	18,897	15,676
Forest Surveys (Imperial)	...	...	...	...	...	...	...	...	...	59,556	78,090	58,930	58,929	60,165	60,325	46,878	40,335	42,489	41,595	30,940	19,823	19,180	28,348	32,868	22,164
Forest School	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	22,568	24,239	30,831	33,129	32,961
Andamans	...	...	...	...	...	150	...	1,651	1,896	...	...	...	1,307	1,096	...	7,177	2,160	2,306	1,840	12,161	22,760	37,035	25,769	62,679	57,295
Total	15,51,981	10,98,437	12,55,922	14,46,936	17,28,902	23,73,109	28,87,156	26,79,888	28,64,728	29,05,523	30,52,589	28,63,632	31,48,279	30,04,442	30,82,949	30,72,691	30,37,324	38,35,871	38,01,740	41,67,252	41,50,563	40,79,137	41,14,548	41,31,532	50,04,844
Madras	2,64,780	3,51,392	3,42,827	4,02,674	4,01,617	4,21,316	4,47,267	3,91,921	5,48,746	4,74,920	5,95,911	5,92,039	6,35,360	5,65,624	4,95,914	5,48,527	5,19,270	6,03,419	6,45,352	7,86,733	8,96,505	9,37,972	11,53,122	11,29,212	12,20,794
Bombay	3,72,187	7,77,139	6,51,641	5,55,039	6,31,226	5,56,015	6,39,759	5,97,831	7,25,031	7,21,594	8,36,675	7,94,141	8,38,979	8,77,716	10,04,923	10,76,989	11,67,347	11,69,181	12,78,770	15,64,172	17,78,723	18,39,461	19,52,910	19,44,005	16,93,962
Total (British India)	21,88,948	22,26,968	22,50,390	24,04,649	27,61,745	33,50,440	39,74,182	36,67,640	41,38,505	41,02,037	44,85,205	42,49,812	46,22,818	44,47,782	45,83,786	47,98,207	47,24,441	56,08,471	57,25,862	65,18,157	68,25,791	68,56,570	72,20,580	72,04,750	79,19,800
Berar	478	8,991	13,718	18,669	34,105	81,569	81,972	1,00,829	83,631	86,350	91,389	91,449	94,652	1,09,968	1,07,350	1,10,506	1,28,968	1,52,985	1,55,054	1,56,779	1,52,649	1,59,242	1,71,704	1,83,765	1,70,212
Forest Survey (Berar)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	15,043	34,894	42,940	45,472	42,098	23,955
Baluchistan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	16,416	17,682	11,962	18,911	13,266	15,799	17,836	17,753	15,994
Grand Total	21,89,426	22,35,959	22,64,108	24,23,318	27,95,850	34,32,009	40,56,154	37,68,469	42,22,136	41,88,387	45,76,594	43,41,311	47,17,470	45,57,750	46,91,136	48,08,713	48,69,825	57,79,138	58,92,878	67,06,890	70,26,510	70,73,551	74,55,592	74,48,366	81,29,761

* Includes pay of Inspector General of Forests, certain Home charges, and undistributable and petty local items.

STATEMENT III.—*concluded.*

SURPLUS.

Provinces.	1864-65.	1865-66.	1866-67.	1867-68.	1868-69.	1869-70.	1870-71.	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	1888-89.
	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Imperial*	−43,786	13,978	−31,326	−38,381	−31,848	−52,670	−48,316	−64,196	−64,379	−77,991	−80,966	−43,774	−41,514	38,673	−47,240	−56,596	−46,401	−50,228	−56,536	−95,359	−69,732	−73,537	−82,113	−73,779	−82,182
Bengal	15,789	−6,634	−59,625	−1,11,456	−15,218	1,26,758	16,770	33,730	49,075	40,092	84,571	55,598	7,901	1,63,815	77,352	1,73,776	2,25,959	2,39,122	3,11,776	3,06,521	1,53,237	2,27,033	2,30,853	2,67,426	3,00,637
N.-W. Provinces and Oudh	2,19,860	4,00,121	3,63,993	1,94,697	2,84,199	3,03,523	−3,85,816	60,829	7,64,449	7,41,893	3,02,056	5,27,377	2,89,309	4,74,182	3,16,778	3,23,372	2,62,654	1,49,882	1,74,378	5,69,498	5,52,218	4,88,976	6,53,976	4,16,706	6,18,258
Punjab	−51,535	79,311	1,32,677	−7,589	27,248	−3,47,303	−2,48,419	2,597	−2,37,371	1,20,983	1,75,891	3,52,920	73,095	1,63,080	−22,935	1,69,143	1,76,310	1,72,039	2,05,953	2,57,031	1,91,282	1,74,936	4,10,767	1,09,024	4,51,883
Central Provinces	−86,510	25,445	88,064	1,31,956	31,410	−58,910	3,40,192	3,25,495	2,31,095	2,82,428	3,66,489	3,52,849	3,71,031	3,61,876	4,59,104	4,84,150	3,54,627	6,75,871	5,65,400	5,58,711	5,31,381	5,91,462	4,58,117	5,40,430	5,11,708
Burma (Lower)	6,71,140	5,86,514	1,37,781	3,16,286	3,93,266	5,62,668	4,17,273	3,93,183	4,90,810	5,93,317	4,11,255	9,63,361	5,45,854	7,44,851	4,19,160	4,26,700	8,04,045	10,81,586	12,74,941	12,91,451	4,58,749	8,72,907	9,22,837	11,86,203	13,77,361
„ (Upper)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,05,886	1,75,724	7,94,799
Assam	...	...	...	...	...	...	...	...	...	...	5,582	−1,527	−8,957	33,173	35,751	31,508	26,272	693	76,782	11,883	−17,285	−14,838	−276	40,420	93,977
Coorg	54,081	83,161	23,858	95,360	80,618	75,071	47,397	22,288	54,916	64,332	20,016	67,292	42,235	64,717	17,191	46,621	31,370	40,568	73,252	12,799	36,282	23,696	25,203	54,399	56,008
Ajmere	...	...	...	...	...	...	...	...	−13,030	−17,628	−15,079	−26,936	−21,555	−11,924	−12,204	−11,889	−11,299	−9,889	−4,158	−6,376	−5,880	−6,772	−9,470	−4,604	−2,102
Forest Surveys (Imperial)	...	...	...	...	...	...	...	...	...	59,556	−78,090	−58,909	−58,929	−60,165	−69,262	−46,840	−40,063	−42,489	−41,247	−30,904	−19,589	−18,978	−28,107	−32,828	−21,849
Forest School	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	−22,495	−23,966	−30,416	−32,352	−32,512
Andamans	2,898	2,515	3,495	6,070	5,071	2,886	7,373	4,229	4,966	4,181	5,516	5,363	3,372	205	5,564	−4,740	25,574	46,101	69,018	12,601	−547	−13,091	6,101	41,383	48,780
Total	7,81,847	11,89,411	6,63,920	5,56,113	7,44,766	6,12,023	1,46,454	7,78,155	12,80,558	16,92,041	11,98,141	21,90,614	12,01,850	19,72,013	11,88,259	15,35,203	18,09,045	23,03,250	26,49,565	29,17,856	17,93,641	22,25,828	26,63,358	26,88,152	41,14,766
Madras	1,84,930	1,25,282	1,05,283	1,78,668	1,27,568	2,76,333	86,145	1,84,340	46,442	1,38,733	−81,540	85,831	−42,937	−15,314	1,10,874	76,641	2,17,610	2,03,489	2,61,090	1,66,971	2,70,411	2,60,678	93,789	2,45,708	2,94,212
Bombay	7,09,720	2,30,472	1,69,627	3,29,205	5,82,257	6,79,242	5,28,642	5,52,384	4,21,374	4,66,495	3,87,376	4,54,531	3,87,679	3,83,812	1,76,971	4,47,723	3,55,460	6,58,936	8,11,583	9,38,928	9,96,119	15,26,825	10,79,766	10,88,572	11,56,228
Total (British India)	16,76,557	15,45,195	9,38,830	10,63,986	14,54,591	15,67,618	7,61,241	15,14,879	17,48,374	22,97,272	15,03,977	27,30,979	15,46,542	23,40,511	14,76,104	20,60,567	23,82,115	31,65,675	37,22,238	40,23,755	30,60,171	40,13,331	38,36,913	40,22,432	55,65,206
Berar	1,880	6,115	29,856	34,771	50,452	98,828	95,357	54,714	1,72,932	1,76,906	1,69,285	1,41,283	1,58,420	1,69,268	1,81,354	1,96,994	1,37,588	80,526	1,36,960	1,51,439	1,44,536	1,60,609	1,54,552	2,22,682	2,37,765
Forest Surveys (Berar)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	−15,043	−33,870	−42,309	−44,821	−41,502	−23,955
Baluchistan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	−2,040	934	−6,923	−12,159	−7,177	−837	−3,755	−3,690	−10,326
Grand Total	6,78,447	15,51,310	9,68,686	10,98,757	15,05,043	16,66,476	8,56,598	15,69,593	19,21,306	24,74,178	16,73,262	28,72,262	17,04,962	25,09,779	16,57,458	22,57,561	25,17,663	32,47,135	38,52,275	41,47,992	31,63,660	41,30,794	39,42,894	41,99,922	57,68,690

* Includes pay of Inspector General of Forests, certain Home charges, and undistributable and petty local items.

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